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The Function of Hand Work in the School

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From the standpoint of evolution, education "is the adaptation of a person, a self-conscious being, to environment, and the development of capacity in a person to modify or control that environment." * This environment on the one side is the physical world with its facts and forces, on the other that vast complex evolved through human thought and feeling which we call civilization. The educational process involves adaptation and control in both of these spheres, and its goal is the harmonizing of the individual will with the upward forces operative in both. The immediate end before the individual at each stage of this development is effective participation in the life of his fellows, and the aim of education may be stated in terms of our current philosophy as the development of social efficiency in the individual.

Such an aim evidently implies, on the one hand, the building up of knowledge and motives of social value, and, on the other, the development of power to apply such knowledge and motives to social ends. The condition underlying such growth and such development is evidently that of interaction with the environment. Impressions and experiences come from without and leave their mark in mental changes; the individual reacts and develops capacities. But what is the trend of these reactions, and what are the lines of growth that stand for social efficiency?

Prof. John Dewey states that "all conduct springs ultimately

* Nicholas Murray Butler, "Religious Instruction and its Relation to Education," *Educational Review*, December, 1899.

and radically out of native instincts and impulses." * In Prof. Wm. James's words, "Education (is) . . the organization of acquired habits of conduct and tendencies to behavior." † Taken together these statements apparently mean that the task of education is to organize instinctive tendencies in human nature into habits of social value. What then are the vital native instincts, and what is the nature of the habits to be developed?

Strongest of all the tendencies evident in human life are the instincts that make for self-realization. Perhaps we may better say that these tendencies constitute the active principle in human life, and that to put forth and express the self in outward form is the first law of being. The mere bodily structure involves continuous reaction at contact with the outer world. "Every current that runs into it [the brain] from skin or eye or ear runs out again into muscles, glands, or viscera," ‡ and the sum of these reactions, when guided by reason and the will, constitutes the story of the individual life. This registering of impressions in some form of motor discharge represents, we are told, not only a natural tendency of the organism, but is at the same time an essential condition in securing a lasting quality in such impressions. "No reception without reaction, no impression without correlative expression." §

Viewed in this light, impression and expression are but two phases of the mental and bodily response to outward stimuli, each playing an essential part in building up knowledge and in developing capacities. Intrinsically and outwardly then we are what we do. In this embodiment in outward form the self develops its structure and writes its record of performance. It is peculiarly true that the social value of the single life is measured on the side of outward manifestation. As the individual conceives, images, and reflects he affects others only potentially; as he acts and puts forth, and then only, does he enter into the life of society and become an influence in that life. The very meaning of social efficiency is obviously the ability to put thought and feeling into forms which will reach the thought and feeling of others.

* John Dewey, "Ethical Principles underlying Education," *Third Year-Book*, National Herbart Society.

† Wm. James, *Talks to Teachers*.

‡ *Ibid.*

§ *Ibid.*

This inner demand for expression in deed and word is fundamentally the motive for all our effort. We attend to things not for the sake of mere knowing, but to be the better able to make use of our knowledge, and better to play our part in the world.

With the adult, expression of the self in conduct and achievement takes many forms, both spiritual and material. Family and social life develop manifold manifestations of the individual spirit. The relations of husband, friend, citizen, and worker are but different channels in which the soul displays its qualities and fulfils its tendencies. As the grasp of cause and effect deepens, and the mental horizon widens, life tends to declare itself in more and more subtle and indirect channels. The realization of an end often means the setting in motion of a long and complicated chain of causal agencies which operates only gradually and cumulatively towards a result. Expression culminates in the revelations of the spirit, and the highest expression may be but a sacrifice of action. "They also serve who only stand and wait." But whatever be the form, the measure of life is the extent to which the individual impresses his thought and ideals upon his surroundings,— the degree, in short, to which the individual affects the social whole. There are indeed instances where, through lack of vitality, mental one-sidedness, or lack of social sympathy, this instinct towards expression seems almost absent, but these cases are fortunately rare, and for the race at large to live means to do, to achieve, and to serve.

This instinctive tendency towards self-expression represents not only the primal instinct or sum of instincts in human life, but its realization in social terms represents also those activities which education demands shall be organized into habits.

What are these habits, indeed, but the habits, speaking broadly, of carrying sound thought and right feeling into action? To carry thought and feeling into action is precisely the function of self-expression. Without these intrinsic elements expression is barren of the self, barren of satisfaction, and barren of educative return.

The real question here relates to the quality of self-expression involved. That this expression should take right directions and be effective in its character, in other words, that it should serve social ends, is evidently a fundamental requirement. Whether the habits formed are effective and whether they tend in right

directions will evidently be very largely a question of the nature and influences of the particular environment to which the individual is exposed. Practically speaking, then, the important thing to be realized from the self-expressive tendencies in the matter of habits is disciplined powers of right action in the life conditions that confront the individual at each stage of growth.

To summarize the foregoing argument, it would appear then that the fundamental need of education, in building up the knowledge, motives, and powers that make for social efficiency, consists in the provision of natural and appropriate opportunities for the self-expressive tendencies in lines that stand for social service.

In the early years the natural and organic character of the demand for self-expression is strikingly evident. It is, indeed, the most obvious thing about the normal and healthy child, but life at this stage is less complex than with the adult, and with his smaller horizon and crude powers of perception and reasoning, the natural forms of expression must needs be simple and direct. Neither reason nor the will carries the young actor to very distant or devious ends and an idea or an impulse that reaches consciousness finds its immediate reflection along the line of least resistance.

We are coming slowly to understand what an immensely important factor manual expression represents on this side of child life. It is true that in these early years as in the rest of life spoken language is the largest instrument of expression. Gesture, written speech, and music have also their particular and necessary functions ; but drawing, painting, modeling, and construction stand in specially significant and essential relations to child nature. The child's world is very largely concrete and material. His mental outlook is based upon sense impressions, and his instinctive activities deal mainly with visible and tangible results. As Kipling has said, "A child's mind is bounded by his eyes." At this stage the reality has a meaning long before the symbol, and visible embodiments of the actual fact have a satisfying and comprehensible quality, far in excess of word expression. While the mental life is so much of this character, it is evident that the natural activities will deal largely with material things and that the instinctive tendencies will find their truest

fulfillment in these conscious values. Not only is the incoming stream of impressions largely a matter of the material world, but the nature of childhood and boyhood makes this world a natural field of action. That the child is emphatically a motor being means to us primarily that his motor reactions tend to issue in the larger muscular movements. He must give play to the growing muscles over which he is just gaining control. He must run, leap, and wave his arms, and, above all, he must do things with his hands. Whether the school gives opportunity or not he must build his sand fort, his cave, and his hut, and make his pictures of the real or fancied world.

The motive underlying such activities goes beyond mere execution. The fact that the products of such activities have a use, a part to play in the life of the individual at that particular moment, is the root of the incentive. The fact, too, that such results can be shared and made to minister to the service of others in a very definite, tangible fashion represents one of their greatest meanings and values. The real value of both activity and result is the natural opportunity afforded for self-expression. The products are tangible and convincing embodiments of the self. They are visible achievements that at certain stages of growth represent a satisfying fulfillment of the inner life.

Outside of these important relations of manual activities to child life is the vast significance of the graphic and constructive processes in their relation to the life of society at large. Through these activities man has gained the present control of his environment and made possible the social life of to-day. Civilization with all its meaning in spiritual and mental life still rests upon this foundation, and the energies of a large share of the human race are to-day devoted to direct participation in these activities. Any outlook upon social life consequently can hardly be sound or adequate unless it rests upon an insight into these fundamental industrial and economic relations, and preparation for that life can hardly be strong and rounded unless it has involved some direct contact with such activities.

It is through these activities also, that the creative imagination plays about the material world and evolves its images of use and beauty. Not only does invention and improvement in constructive design take form through these channels, but through them are revealed as well the manifold creations of the artist. Not

only do these processes lie at the root of practical affairs, but in various guise of form and color they serve as media for the highest expressions of the human soul and minister to the deepest needs of the spirit.

Enough has perhaps been said to indicate the great importance of expression through the hand, both as an organic need of child nature and as a road to the knowledge and powers of value in social life. If such important functions are represented by these activities in the educational process at large, it is evident that they must claim, not a subordinate and isolated place in instruction, but a fundamental and intimately related part in general school work.

As has been noted before, it is in the earliest years of childhood that the instinct towards material forms of expression is strongest and most significant. It is then that the graphic fact has the greatest value as a road to comprehension, and it is then that the evolution of the concrete product most helpfully fosters the sense of self-achievement. It is consequently in the elementary school, and particularly in the lower grades, that manual expression is most important as a method of instruction. Beyond this point manual work undoubtedly becomes less necessary and natural as a common form of expression, and its educational importance is represented more and more in its significance as subject-matter. In this later educational period the forms of manual expression that best fulfil the purpose of the school are unquestionably those which relate to the temperament and tastes, and, in a broad way, to the after-life of the individual.

With the child of the primary grades, however, we have a being absolutely dependent upon objective creations for the competent expression of its mental life, and a being in whom the tendency toward such expression is constant and spontaneous. In the kindergarten and lower primary grades the instinct toward such expression is largely represented by the tendency to reproduce the actual or the imaged environment. All through this period the mental activities of the child are largely concerned with the collection and classifying of sense impressions. These impressions with their emotional references form the imaginative life of the child, and tend constantly to issue in tangible form.

In the kindergarten the child's immature powers of perception and reasoning render him content with crude symbols of the real

fact. As has been often pointed out, he sees only the large or the striking features of an object,—the mass, not the detail,—and it is these he seeks to reproduce. But with growing powers he comes to perceive finer and finer differences, and his reproductions tend more and more to approach the reality and to involve greater detail and accuracy.

It is on this side of representation that occur the most obvious possibilities of relating manual expression to the impression or knowledge side of the school work. Here, both in regard to the facts of science and the imagery of story, pictorial and constructive expression lend themselves in a fitting and effective manner to deepen and vivify impressions. It is then that the drawing of natural forms, the making of Hiawatha's canoe, his wigwam, and his blanket, and the reproduction of the log house of the colonist have their natural and fruitful opportunities.

It is by no means essential, indeed it would be most unnatural, that such expressions of observed or pictorial fact show an exact correspondence with the reality. The important point is to obtain a true index to the image in the child's mind, and so develop the opportunity to strengthen and correct that image. Failure to use the methods of graphic expression because the child is not capable of making an exact reproduction, is to ignore child nature and to run the danger of overestimating his capacity for accurate imaging.

This tendency to both pictorial and constructive representation so strong through the earlier years persists in some degree for a long time, but as the interest in and demand for reality increases, the natural trend of constructive expression is towards results that serve a practical and useful purpose. When this tendency has strongly developed, the problem of connecting with the other school work, on the constructive side, becomes more difficult, and the possibilities in this direction depend almost entirely upon the plan and spirit of the school work as a whole. If the course of study is built upon the conventional plan of a series of clearly defined subjects and processes, each pursued in an independent and unrelated fashion, and is not based upon some central motive arising out of the natural instincts and capacities of the child and his relations to social life, the possibilities of systematic and effective use of manual expression in the service of the school are of course very much limited. It is only when such a central

thought is present in the work of the school towards which all its resources contribute that manual expression can reach its full scope as a method of instruction.

The general plan and spirit of the school conditions also another possibility of these activities, viz., the matter of co-operative work. If we are to prepare effectively for social life through the school, one of the things that seem most evident is that the school must reproduce as far as possible the conditions to be dealt with in life. As Professor Dewey puts it, "The only way to prepare for social life is to engage in social life." Manual work unquestionably presents peculiarly practical opportunities in this direction. Where the project is a common end that inspires all with a unity of thought and effort, such work is perhaps the most natural and effective means of bringing the community spirit and conditions into the school.

It is true, on the other hand, that the opportunities of introducing such work under ordinary school conditions in a thoroughly natural manner above all but the lowest grades seem very limited. And it should be borne in mind that unless co-operative work is of a nature that affords each worker both incentive and opportunity to play his due part, it soon degenerates into disproportionate activity on the part of a few, and dependence of the weaker or less-interested workers, and does little to develop self-reliance and initiative on the part of the latter. The practical problems presented here are very large ones, and until further experience has been obtained in this field it will evidently be impossible to define the limits of such work in the later grades and with large classes.

Perhaps the greatest practical problem in all of this work is that of bringing the worker's own thought and feeling into the process in a real and, at the same time, an effective fashion. We must keep constantly in mind the truth that to leave out these elements is to leave out the pith of the activity—to leave out the life within the form. We may expect to find right motive in the work only when the worker realizes that the thing attempted is well worth the doing. This by no means implies that the task should be merely pleasant or agreeable, nor does it mean that an immediate end must necessarily be present in the operation. It does mean, however, that the undertaking must minister in some way to the life instinct of the worker. It means that the particu-

lar thing attempted must bring either added insight or sense of worthy achievement.

We dwell upon the importance of basing all instruction upon interests, but the real dominating interest which in a large sense comprehends all others is this interest in the fulfillment of the self. We are truly interested in things only as they minister to self-realization, only as they relate to the possibilities of appropriation and service for our special needs. The interest in a fact or a subject is but one side of the larger instinctive interest. The one conception of interest is static, the other dynamic.

On the other hand, if we are to obtain the fullest mental return from these activities the worker's own thought must be directed to the thing done. Only when the pupil is given opportunities for determining ends and working out means may we hope through manual expression, or indeed through any school work, to develop in the highest degree independence of thought and power of initiative.

Both of these factors are essential in true self-expression, and both are essential to the vitality of manual activities in the school. The making of a project planned by the teacher may mean much, but the making of a project conceived and planned by the pupil means more. Only in this way is the natural cycle of mental activities—feeling, thinking, and doing—fully realized and made effective. Only in such terms can the full satisfaction and exhilaration of self-achievement be realized.

The practical realization of this principle means, of course, a distinct problem of instruction. How to give play to the young worker's immature ideas and at the same time obtain results that will develop his capacities in the most helpful way is a question not readily answered. The problem presented is essentially one of proportion and balance between freedom of expression on the one side and skill or mastery of process on the other. Extreme emphasis on the one side leads inevitably to a chaos of crude and ill-considered products, while attention restricted to the other results in mere drill and formalism.

Through all such work runs the necessity of keeping pace with the intellectual progress of the individual. At each stage the thing done should be something adequate and satisfying to the consciousness of the worker. It must be no superfluous operation, but one in which the sense of achievement keeps pace with

the feeling of capacity. There is no tonic in life so salutary or so stimulating as the consciousness of worthy achievement, but the achievement must be worthy of one's steel.

Adequate opportunities for manual work in this sense are not readily offered beyond a certain point by the school studies commonly met with to-day, and such work must, at least at present, find its own content to a large extent directly in the social environment outside of the school. Home life with its ethical, industrial, and economic relations furnishes the closest and most natural illustrations of social activities, and typifies in concrete fashion the broader social world. This field and, to a lesser extent, play life represent, and will always represent, perhaps the most profitable and at the same time most practicable centers of immediate inspiration for manual work in the school.

The real thing is to connect with life, to connect with the natural healthy instincts that make for mental, moral, and physical growth in such way that every step tends to strengthen the sense of self-fulfillment and the powers of social effectiveness.

In the high-school period the same close connection with the immediate interests and activities of present social life should obtain, but allowance should be made for the changed attitude of the pupil. The purely material result is no longer in itself an entirely adequate symbol of achievement. The mind is now capable of perceiving the relations between the immediate and the general, and is interested in experiences not wholly for their present meaning but in their value as related to more or less remote ends. Interest has now developed in the growth of knowledge and powers in their broader significance, and the value of any subject must rest in a large measure in the extent to which it embodies and represents some important phase of social activity. The worker in the shop, laboratory, or school kitchen is no longer satisfied to stop short with the concrete result. He demands insight into the larger meaning of his experience and the relations of his special task to the interests of society as a whole.

Much may be said of the healthful and invigorating influence of manual activities at this adolescent period of life and of the tonic value of the concrete and external interests involved, but these alone cannot suffice to satisfy the growing standards of self-achievement. To these values must be added an insight into the

large factors typified by the immediate experience, viz., the artistic, domestic, industrial, and economic relations of society.

Upon this side important elements are the consideration of the sources and distribution of the raw materials dealt with, the processes and changes by which these raw materials are brought into commercial form and transformed into finished products, the industrial and economic factors involved in these processes, the tendencies of modern development, and the part played by these materials, industries, and products in the national wealth.

And finally the spirit back of such instruction in the high school and at all other stages should not only contribute to enlarge the outlook upon the life of to-day, but should serve as well to quicken the sympathies with the underlying forces operating in that life. Not only knowledge and skill should come from the hand-work experience, but a recognition of the great ends served by such activities and an opening up of interest in the aims and ideals of those whose lives are spent in such work. Such experience should tend to develop interest and sympathy in these great provinces of art and industry as worthy fields for the highest triumphs of self-achievement, and an enthusiasm at the prospect of contributing in some measure to serve and control these great agencies of modern life.

In such ways may this work not only lead to a better insight into the civilization of to-day, but, at the same time, play its part in developing ideals and aims in sympathy with the forward movement of that civilization. In such ways may manual work in the schools do its part to bring about that complete living of the philosopher which shall comprehend in its understanding all the basal activities of our social order and in its sympathies all the ideals.

Courses of Study in Elementary School

The specific projects indicated in the following plan of hand work should by no means be considered as representing fixed quantities. Such work should of course vary with school conditions and locality, and any definite scheme should be regarded as but a suggestion of practical possibilities. The particular plan outlined below represents for the most part work already tested in practice and adjusted to the special conditions and course of study of the Horace Mann School. The headings used in the first five grades represent the subjects with which the accompanying work has its main connections.

Original Poster for Annual Exhibit of Drawings.

FIRST GRADE

Five thirty-minute periods throughout the year

I. Nature Study:

Draw flying seeds in pastel singly and in groups.

Make paper boxes and envelopes for holding seeds.

Paint in water-color simple groups of twigs and grasses in a given space. Draw sprays of oak and pine with brush and ink.

Make press in which to dry leaves and blank book in which to mount them.

Paint in brush and ink or water-color, potatoes, turnips, carrots, radishes, and beets, both with and without foliage.

Model some of the vegetables in clay. Compare size, form, and color.

Similar study of pumpkin or squash.

Sketch in water-color oak and pine trees in vignette. Compare shape and color in foliage and trunk.

Study of squirrel, rabbit, and duck in clay,

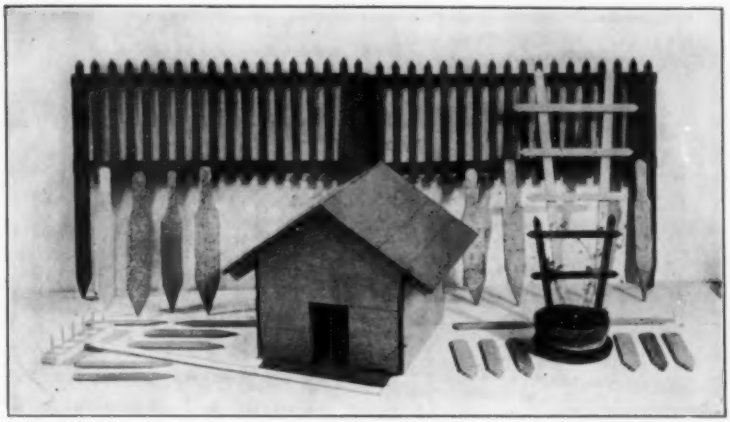
Brush and Ink Drawing of Pussy Willow.

brush and ink, or water-color, in different positions and action. Selection of particular pose by child.

Make seed labels of paper and splints for seeds planted in flower-pots. Small wooden trellis for same.

In connection with garden work in the spring:

Make wooden seed labels, digging spears, trellises, and fence.



Some of the Implements and Fixtures made for the Garden Work.—First and Second Grades.

Study of vegetable farm. Construct typical farm on large sand table, using earth, clay, paper, wood, straw, etc. Lay out general arrangement of ground with reference to farm buildings, spring and crop fields. Make barns and other buildings, well, watering trough, haystacks, dove-cot, bee-hives, carts, harrow, etc. Develop function, form, and arrangement of details from the children.

In connection with study of the weather:

Make wooden vane and paper windmill; weather flags of colored paper; weather charts.

Make compass card and needle of thick paper, placing the cardinal and semi-cardinal points.

With particular reference to number work:

Make sun dial, first of paper, and then larger one of wood to place in the garden.

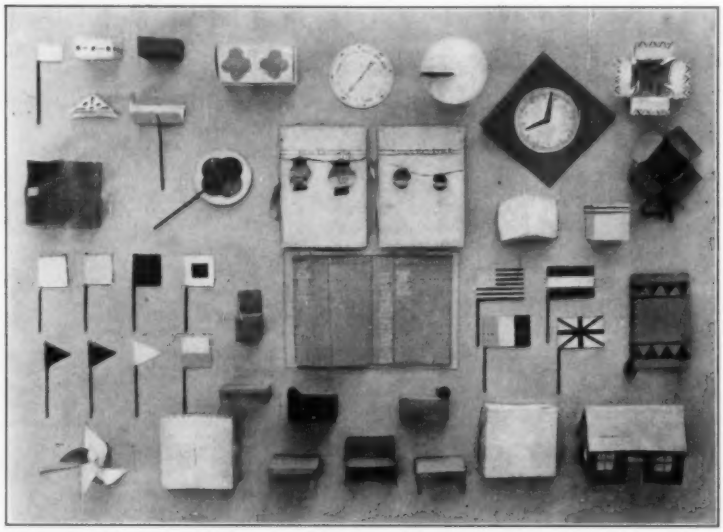
Sand glass of paper cones.

Clock face with hours placed and figured.

Make wooden frame in which to hang ball for pendulum.

II. Language and Reading:

Paint in ink or water-color, child posed as Longfellow's *Village Blacksmith.*



Construction in Paper.—First and Second Grades.

Child posed to illustrate Stevenson's *When I was Down Beside the Sea.*

"Hiawatha's Childhood," from Longfellow's *Hiawatha.*

Paint dandelion in full flower and later in seed.

Model or paint child posed to represent Hiawatha shooting the deer.

Hiawatha Shooting the Deer.

The Pea Blossom, Hans Andersen.

Paint in water-color, pod and spray of leaves.

Paint in ink, boy posed with pea-shooter, and girl with growing pea against window-pane.

The Drum, Eugene Field.

Have drum brought to school and several children march around room. Afterward paint picture from memory.

The Humming Top, Eugene Field.

Have different children spin a top, paint from memory.

Make blank books to be used as dictionaries. Decorate cover.

Binders for verse collection.

Make several national flags in connection with Longfellow's *Flag*.

III. Study of Primitive Life and Occupations:

Make representation of cave life in loam on sand table.

Make tent of skins with sticks and cloth; thatched hut.

Model in clay simple dishes for cooking food. Dry in the sun and bake.

Make icehouse of Eskimo in clay; sled in wood.

Have class make a number of candles by "dipping" and in moulds.

Eskimo Life.—Brush and Ink.

Model in clay examples of primitive lamps.

Make simple forms of Egyptian pottery and decorate with primitive borders.

Have children invent and draw examples of picture writing on small slabs of clay.

Make mats and baskets of tied and braided strands of raffia.

In connection with study of sheep:

Study of washing, drying, carding, spinning, and dyeing of wool.

Weave small blanket on primitive loom built by children.

Weave rug on small school loom giving continuous warp.

Printing on calico with blocks made by children.

IV. Present Social Interests:

Paint in water-color or brush and ink, and model in clay poses of children to represent running, jumping, playing ball and other sports. In action poses, let each child take the pose he wishes to represent.

Make whistle-chain, scissors-guard, horse-lines, and curtain cord by chain stitch and braiding.

Make napkin-ring and hat of raffia. Have designs chosen or worked out by child.

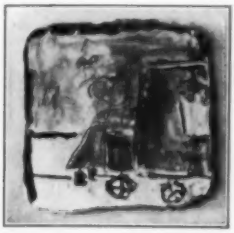
Study of Wool and its Manufacture.

Sew cardboard covers for needle-book and blotter and decorate with original designs.

Make book-mark, mat, and pillow of burlap with blanket and cross stitch.

At Christmas, have children select a present to be made, such as a candy-box, scrap-book or bag, basket for studs, etc.

In February make and decorate a valentine, and for May Day make a decorated May basket of thick paper.



Boarding the Car.—Grooved Outlines and Water-color on Clay.

Boarding the Car.—Brush and Ink.

V. Picture Study:

In each year of the elementary school a study of pictures by old and modern painters bearing upon the particular interests of the grade is made. These pictures are obtained in the very inexpensive form of "half-tone" prints now so numerous. One picture is studied each month. Each child has a print which after the study is mounted on a card. The cards of each pupil are bound together in a book at the end of the year. The name of the picture is not given until the discussion is ended.

Original Poster for Annual Exhibit.

SECOND GRADE

Five forty-minute periods throughout the year

I. Nature Study:

Paint in water-color and brush and ink, twigs of elm, sweet gum, and spruce, sprays of autumn leaves, timothy, sedges, and fall flowers, as in first grade.

Model in clay and paint in water-color fall fruits.

Model and paint cow from cast.
Make churn of bottle and wooden dasher.
Draw or model child posed at churn.
Model chicken and pigeon and paint in water-color from life.
Make chicken-coop, first in paper and splints, and then in wood for housing chickens in garden.

Flower from Nature. — Brush and Ink.

Make pigeon-house to be placed in garden.

Make seed-boxes and envelopes, tools, trellises, etc., in connection with garden work as in first grade, with the addition of rake.

Paint or model poses to represent working in the garden.

In connection with weather study:
Paint in water-color landscapes showing fog, rain, wind, and snow.
Make kites with and without tails.
Make shadow sticks to observe angle of sun.

II. Language and Reading:

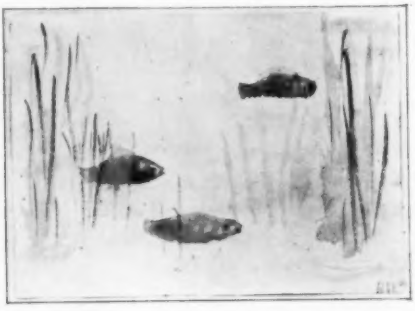
The Gold Children, by Grimm.

Paint or model child posed to represent the man with the golden fish.

The Briar Rose, by Grimm.

Paint and model such poses as the old woman spinning, cook giving the boy a box, Briar Rose with the spindle.

Illustrative Pose in Clay.



From Living Fish in Tank.—Water-color.

The Six Swans, by Grimm.

Treat swans decoratively.

The Street Lamp, by Hans Andersen.

Picture of lamp in brush and ink.

III. Primitive Life and Occupations:

In this grade the study of primitive life and occupations is largely based upon the reading of Longfellow's *Hiawatha* and the planning and making of an Indian village in large sand tray.

Plan arrangement of village with relation to lake, forest, position of wigwams, etc. Make beaver dam and house (beaver studied in nature work).

Make wigwams of twigs and cloth and decorate with simple borders and picture writing.

Make and place campfires, fireplaces, and kettles of clay.

Make and decorate canoes of birch bark or stiff paper (oiled paper may be used).

Weave mats of splints and raffia.

Make and set up Indian loom.

Weave blanket with Indian decoration.

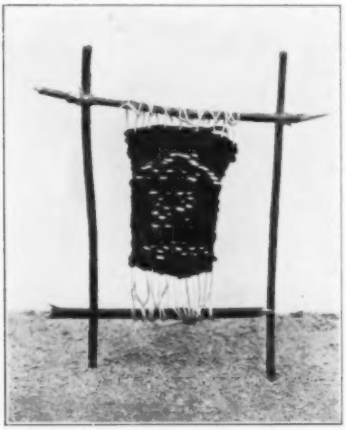
Make and set up frame for curing skins.

Indian Village.

Make pair of moccasins. Bow and arrow.

Make figures in clay of Indians fishing, hunting, bringing home the deer, building the fire, smoking the pipe of peace, working at the loom. When clay is dry paint in water-color.

"Seized the bulrush, the Apukwa,
Dragged it with its roots and fibers . . .
From its ooze the giant bulrush."
Water-color.



Indian Blanket Woven for the Village.

Many other things characteristic of Indian life can be developed naturally from the children's thought and experience. (See *Hiawatha*, illustrated by Remington.)

Paint in water-color from imagination the camp among the trees, Hiawatha's fight with Mudjekeewis; Hiawatha bringing home Minnehaha; blessing the corn fields.

Treat decoratively in water-colors "the sated sea gulls." Also the flight of the birds in autumn.

Make dishes and other examples of Indian pottery in clay. Decorate in water-color.

Indian Pottery Clay with Original Decorations in Water-color.

After the Indian pottery has been made by shaping with the hands, develop the idea of turning clay about center and make simple potter's wheel.

Study of linen and silk similar to that of wool in first grade. Raw material. Processes of manufacture.

IV. Present Social Interests:

Make small house, open in front, of one or two stories, and furnish and decorate in fashion of actual home. Make frame of wood and cover with strawboard; cover walls and floor with

House of Wood and Strawboard, Furniture of Wood and Paper.

figured paper. Furniture, fittings, picture-frames, etc., of rather stiff colored paper. Table cover, bedspread, curtains, and portieres of thin canvas. Hammock of tied cord.

Make golf stocking on small knitting machine.

For Christmas, articles made of raffia, paper, or cloth, and decorated. Small paper articles may be decorated by repeats of natural forms secured by folding, also by verses and mottoes printed in simple letters based on the square.

THIRD GRADE

Five forty-minute periods throughout the year

I. Nature Study:

Paint in water-color and brush and ink sprays of wheat and oats and ears of corn arranged in given space.

Make flail to thresh some of the grain studied in nature work.

Paint in brush and ink and model in clay various poses of cat in the schoolroom. Also Barye's tiger from cast. Compare.

Paint in water-color or model in relief groups of maple twigs and simple flowers.

Paint in water-color simple tree landscapes with special study of sky line.

Draw the horse from cast with pencil, brush, and ink, and model in clay. Observe action and structure.

Paint girl posed riding horse.

Paint boy posed riding horse.

Poster for Annual Exhibit.

Paint and model in relief live or mounted birds. Treat decoratively. Study color.

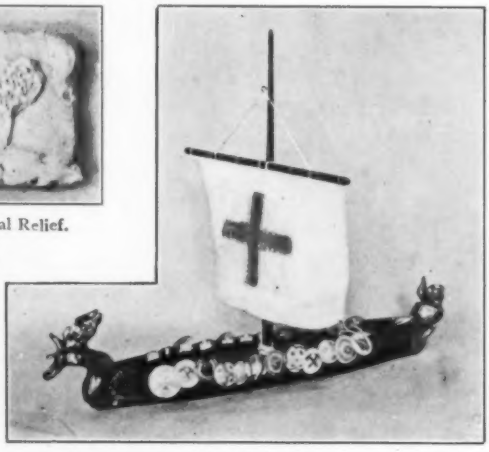
Make nests of clay, straw, and twigs.

Make rain-gauge of wide-mouthed bottle and wooden standard and rod.

II. Geography:

Study of transportation and communication:

The Jin-riki-sha.—Original Relief.



Norse Galley.

Paint two children posed with carrier pole and load.

Make small prairie schooner of wood and cloth.

Make flatboat or canal-boat. Construct working model of lock with oiled clay or plastilina and strips of wood.

Build model of galley or viking ship and of sailing vessel. Sew sails of tape.

Make string telephone to connect two rooms.

III. Language and Reading:

Knights of the Round Table and *The Court of King Arthur.*

Make representation of tournament at Arthur's court on sand table.

Allow each child to select knight or lady he wishes to represent. Model figures in clay, some seated, some standing, some about to mount horses, some mounted, and some tilting.

Make shields of paper covered with gold and silver, spears of wood bright tipped, banners of silk with devices painted or embroidered upon them, banner poles, trappings for the horses in silk and wool emblazoned with devices in paint or embroidery.

The tents of the knights with banners in front. Colorings must be carefully considered to harmonize as a whole.

Model Arthur's castle in clay.

Model chairs of each knight of the Round Table. Each child make chair with figures and name on back.

Paint two children posed to represent Arthur bestowing knighthood.

Crusoe's Cave and Stockade.

Robinson Crusoe.

Paint child posed as Robinson Crusoe discovering Friday's footstep.

Model in clay Crusoe marking the days.

Construct model of Crusoe's cave, tent, stockade, furniture, baskets, raft, etc., on sand table.

IV. Occupations:

Study of cotton industry:

Comparison of cotton with other textile materials.
Processes of ginning, spinning, and weaving.
Paint cotton plant.
Draw pose with basket to represent picking cotton.

V. Present Social Interests:

Figure from Life.—Water-color.

Make shipping tag and scrap envelope of thick manilla paper.

Make and decorate book-mark, wall-pocket, picture-frame, handkerchief-box, and candle-shade of thick cover paper or bristol-board of various shades.

Draw patterns before cutting with scissors, using rule, compass, and small triangle.

Make basket-ball or school bag of tied cord.

Sew on buttons for clothing.

Sew ball cover.

Make small bag for buttons or marbles.

Practice in darning sweaters.

At Christmas presents of cardboard, cord, raffia, and splints, or of sewn work may be made.

From Memory after Pose.—Water-color.

FOURTH GRADE

Four forty-minute periods throughout the year

I. Nature Study:

Paint in water-color sprays of leaves, twigs, and fruit of sycamore arranged in given space. Work for character and color.

Poster for Annual Exhibit.

October: Select familiar landscape near the school including, if possible, a fruit tree and one of another type. Make careful pencil drawing. Block in with simple wash. Autumn colors.

November: Paint nuts, seeds, and apples.

December: Paint imaginative scene illustrative of Christmas, using nuts and apples previously studied.

January: Paint same landscape as in October, with snow on the ground.

February: Paint arrangement of dry twigs from "our" tree.

March: Paint same landscape previously studied on gray day.

April: Paint first buds from trees in landscape.

May: Paint blossoms from same trees.

June: Paint same landscape again.

Fleur-de-lis from Nature.—Water-color.

Make pencil sketches of dog from cast and from living model. Make memory sketches showing action. Treat decoratively in water-color. Make pencil sketches of bear and wolf from casts.

Make water-color sketches of goldfish in the aquarium.

Draw crab and lobster with brush and ink.

Using ink drawings as motives, make repeats in water-color. Pattern for frieze of playroom.

Dragon-flies from Nature.—Water-color.

Goldfish Drawn from Living Fish.—Water-color.

Paint butterflies, dragon-flies, and other insects.

Make butterfly- or crab-net of knotted cord.

Cut cross and longitudinal sections of small specimens of typical woods to show grain. Cut out with saw and finish with file.

II. Geography:

In connection with study of hunting centers make models of bird, beaver, and bear traps.

Model of lobster trap in connection with fishing centers and industries.

III. Language and Reading:

Lady of the Lake: Study of the plaid. Each child select a Scottish plaid and paint in water-color. Make original design for plaid.

Jungle Stories: Make pencil sketches of tiger and elephant from casts. Make imaginative compositions in water-color.

Other selections from the reading illustrated by action poses. Costume poses to illustrate types.

"The Bittern Sounds his Drum."—Water-color.

Pose Study for "Goosey, Goosey, Gander."—Water-color.

IV. History:

In connection with study of voyages of Columbus make mariner's compass, with double swing frame of bent iron.

In the study of the colonies build model of southern and northern log house and of blockhouse.

V. Present Social Interests:

Make baskets in various forms and varieties of construction in rattan.

Make in bristol board or stiff cover paper of different colors

calendar-back, button or pin tray, court-plaster case, and portfolio. Decorate in water-color.

Patterns drawn and creased (not scored) with dull knife or horseshoe nail.

Surfaces may be decorated by repeats of natural forms dealt within nature study.

At Christmas presents may be made by processes represented during the fall or by sewing.

Settler's Log Cabin.

FIFTH GRADE

Four forty-minute periods throughout the year

I. Nature Study:

Jonquil from Nature.—Water-color.

Cut and finish wood specimens collected by pupils during the summer, so as to show the grain.

Draw simple landscape with nut trees and paint same in water-color, using finders to gain good arrangement in space.

Rubber Plant.—Water-color.

In the spring paint twigs, tree-buds, flowers, and grasses, with special attention to arrangement in given space.

Make memory sketches illustrating "Heat Experiments."

Make thermometer-back of wood, and decorate.

Make wooden test-tube holder.

II. Geography:

Construct working model of windmill connected by crank to small suction pump made of wood.

Make working model of undershot water-wheel. Connect by belt and pulleys to potters' wheel.

III. Language and Reading:

Illustrate selections from readings with imaginative accessories. For example, Whittier's *Barefoot Boy;* pose a boy; make careful drawing with pencil measurements; then paint in water-color from imagination, fields, brook, path, and trees.

Carnation from Nature.—Water-color.

IV. History:

Draw selections from the casts of the Parthenon frieze. Head of Minerva from cast.

Make large drawings with soft point of details of Greek ornament singly and in repeats.

Model in clay details of ornament from casts.

Model examples of Greek vases in clay or modeling wax from reproductions.

Draw vases singly and in groups both above and below the eye.

Construct in wood and cardboard to scale model of the Parthenon, representing only the larger structural features and omitting smaller decorative details.

V. Present Social Interests:

Make memory sketches of objects, landscapes, or poses seen on the way to school.

Make from cardboard or strawboard, binding edges, and covering with thin paper, small savings bank, stand to hold paper and envelopes, pencil-box, and book with stiff covers to hold cuts of pictures studied during the year. Cut and score cardboard with sharp knife held against straight edge.

Make with thin iron strips and binders, and thin sheet copper,

such projects as photograph stand, pen-rack, inkstand, holder for letters, match tray, and teapot stand. The last may be made with cement placque treated decoratively for top. Have pupils modify the arrangement of straight and curved lines in a number of the simple pieces. Consult thought of class as to dimension and form. Work from pupil's own drawing or one made upon the board.

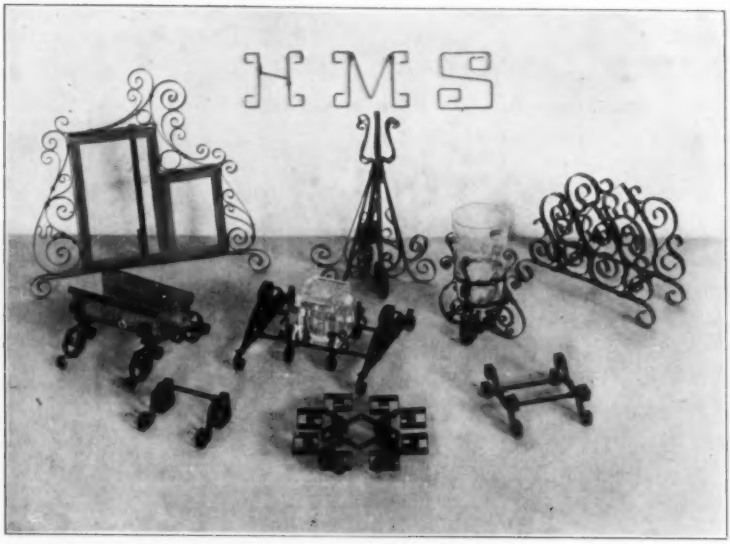
Make by whittling with fixed bladed knife in basswood and pine of $\frac{3}{16}$ inch thickness as well as with thicker wood, such articles as pencil-sharpener, pincushion, calendar stand, memoranda file, easel and frames for photographs or Perry pictures, envelope-opener, tip cat and bat, match-safe and watch-stand.

Use simple bench tools to assist work when practicable.

Decorate by line grooving and by chip carving and by brush and water-color or dyes.

Have pupils make designs of outlines within given dimensions, and also studies for the decoration. The motives of the simplest Greek borders and frets may be studied in the latter connection.

Work with the Knife and Simple Bench Tools.

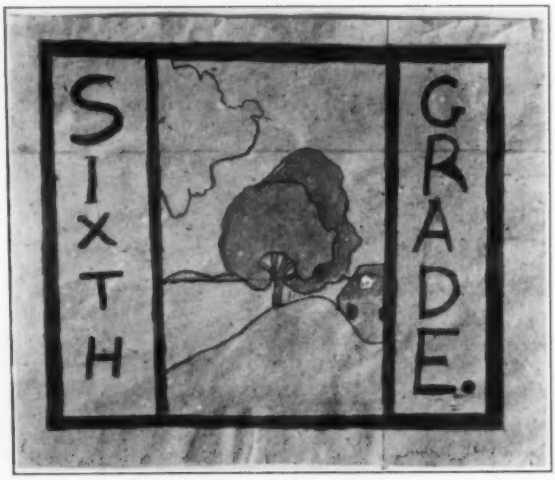


Bent Iron Work.

Make present for Christmas of above nature or of basketry or sewing.

SIXTH GRADE

From this grade on the manual work, although related at many



Poster for Annual Exhibition.

points to the other work of the school, can be most readily classified under the headings of the various processes involved.

Laboratory experiments in science (described in the Nature Study outline) begin with this grade, and a large amount of manual work is hereafter represented in the making and manipulation of simple apparatus.

I. Drawing, Painting, and Modeling—Boys and girls:

Two forty-minute periods throughout the year

Habitual discipline in expression. Study of action, form, proportion, character, and color; arrangement and composition; historic ornament; design; memory and imaginative drawing; picture study.

Materials: pencil, ink, watercolor, charcoal, and chalk.

Study of vases, pitchers, baskets, boxes, chairs, stools, etc., singly and in groups. Blocking in outline. Blocking in two tones of light and shade, by use of white paper and ink. Three tones: white paper and two tones of dark; gray paper, charcoal and white chalk, etc.

Original Illustration for "March."—Watercolor.

Red Riding Hood.—Original Composition in Color.

Similar rendering of flowers, plants, and weeds.

With the aid of drawings previously made, make arrangements of plants, flowers, and weeds in given spaces, using, first, three tones of one color, and then two tones of one and one tone of another color.

Sketch in pencil, charcoal, and flat color several types of trees. Make compositions of trees in line, tone, and color.

Illustrate selections from readings by action poses rendered in three tones. Draw action poses from imagination.

In connection with the history of the Middle Ages make a study of the development of the shield and its devices. Copy the device of William the Conqueror and of Richard Cœur-de-Lion. Make design for coat of arms.

Illustration for Poem.—Water-color.

Make large drawings in pencil and charcoal from casts of Gothic windows and traceries.

Study of the processes of making stained-glass windows. With the aid of preceding lessons on plants, flowers, and shields, make design for window. Small sketch first for arrangement, then large study on manilla paper using charcoal, then wash in flat tones of color.

Make a simple and small model, using pieces of stained glass and lead ribbon.

Design for Stained Glass.—Flowers Drawn from Nature and Adapted.

II. Sewing—Girls:

Two forty-minute periods throughout the year

Review of simple stitches: running, stitching, overhanding, hemming.

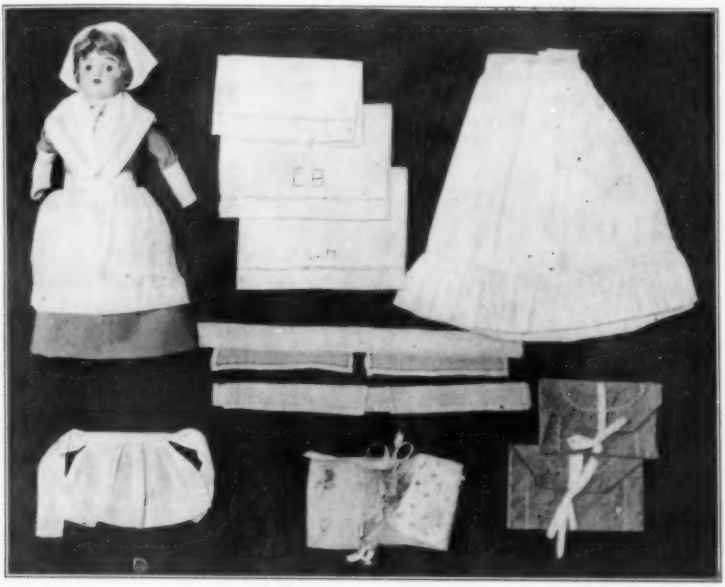
Dress a doll in costume typical of Middle Ages.

Make different garments: drawers, skirt, dress, apron, cap, cuffs, and kerchief.

Practice in darning stockings brought from home and in patching in different materials and by various methods.

Make buttonholes.

Study of the four leading textile industries. Importance in United States. Effect of the ignorance of the shopper on the trade.



Sewing for the Home and School.

III. Wood-work—Boys :

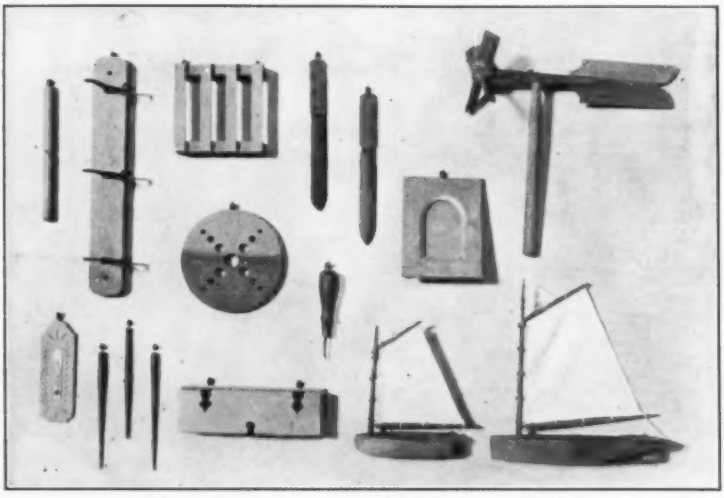
Two forty-minute periods throughout the year

Construct various articles relating to home, play, or school interests.

Simple bench equipment used.

Tools: whittling knife, back saw, mitre-box, smoothing plane, one-inch chisel, spoke shave, hammer, brad awl, try square, and rule. Panel and splitting saws, and several braces and bits provided in addition.

Projects suitable for this grade are: kite-string winder, coat or kitchen rack, flower-pot stand, paper-cutter, photograph frame, pen-holder, awl handle, leather-hinged box for pencils or other material, and simple sailboats without keels.



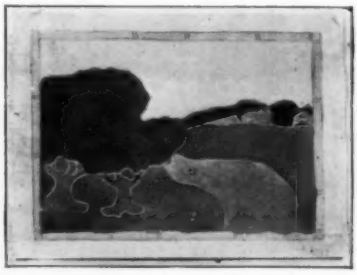
Whittling and Simple Bench-work.

In connection with geography, make instrument to measure the angle of sun in degrees.

Sawing mainly done in mitre-box, and planing used only to smooth flat surfaces and to form curved ones.

Decoration by line grooving, chip carving, and by water-color and dyes.

Make designs for decoration, and consult individual ideas of form and dimensions where practicable.



Original Adaptation of Landscape.—Water-color.

SEVENTH GRADE

I. Drawing and Painting—Boys and Girls :

Two forty-minute periods throughout the year

Study of action, form, proportion, character, and color ; the technique of masterpieces of drawing ; historic ornament and design.

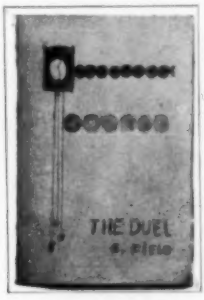
Materials: pencil, ink, water-color, and charcoal.

Study of plants and the figure in light and shade. Block in light and shade.

Study of flowers and grasses for line and color values.

Study of printing and illuminating, with special consideration of initial letters, tail-pieces, chapter headings, grotesques, and marginal illuminations.

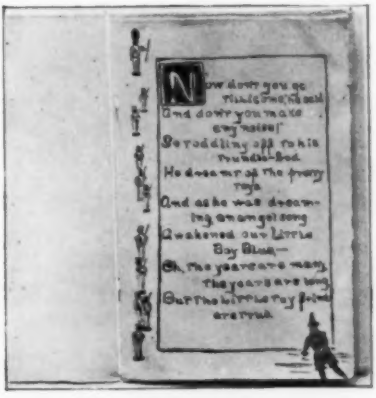
Portfolio to Hold the Year's Drawings.



Original Book-cover.

Study of book-making. Historical development of the book.

Page from Book "Little Boy Blue."—Drawn from Pose.



Page from Pupil's Book.—Original Initial and Decoration in Color.

Have each pupil select subject for an original book. Design initial letters, tail-pieces, and chapter headings. Print title-page and text.

Illustrate by drawings from the pose with imaginary accessories and by drawings from imagination alone.

Design covers for the books.

II. Sewing—Girls:

Two forty-minute periods throughout the year

Draft white skirt and sew on machine.

Make rattan work-bag lined with silk.

Make traveling case with feather stitching.

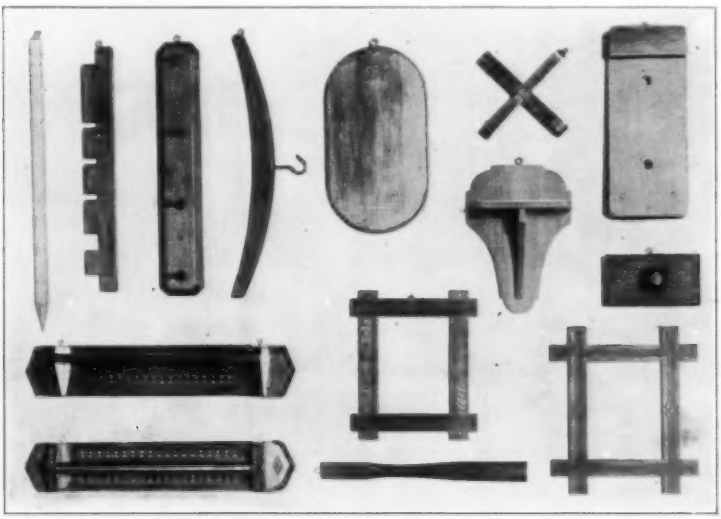
Embroider letters on hemstitched towel or handkerchief.

Study of price, width, quality, and value of cloth and the economical planning and cutting of material.

Jamestown Weed.—Pencil.

III. Wood-working—Boys:

Two forty-minute periods throughout the year



Bench-work in Wood.

A high degree of accuracy and nicety of finish required.

Complete bench equipment involving sets of tools at each bench and a number of general tools.

Use following models as basis of course: plant stick, tool rack, coat hanger, cross stand, bracket, towel-rack, picture frame, hammer handle, blotting-pad holder.

Decorate by line grooving, chip carving, and brush and oil and water color.

Have pupils select from among projects involving a similar degree of difficulty those best suited to individual interests. Have pupils modify form and dimensions of models within given limitations of structure and dimensions.

Design decoration for all models so treated.

Have each pupil make design for one original project.

Design and make in co-operation one project of use in the school.

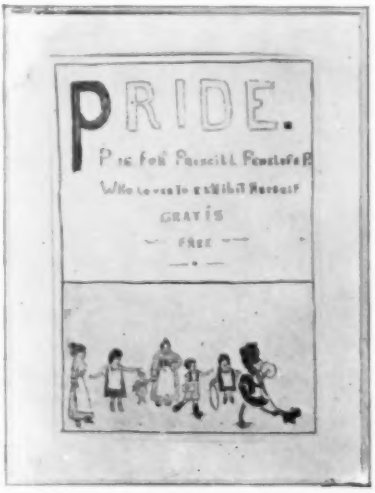
EIGHTH GRADE

I. Drawing, Painting, and Modeling—Boys and Girls:

Two forty-minute periods throughout the year

Study of action, form, proportion, character, and color; technical quallties and methods of expression; arrangement and composition; historic ornament and design. Memory and imaginative work.

Composition.—Figure from Pose, Cats from Poster.



Original Verse and Illustration.—Water Color.

Materials: pencil, ink, water color, and charcoal.

Blocking in contours and shadows of plants and figure by various methods; pencil sketches, charcoal studies, flat wash with outline, water color sketches.

Illustrate selections from readings by drawings from pose and from imagination.

Study of historic ornament as applied to wall decoration. Ancient and modern methods. The design and use of stencils.

Pencil Drawing from Pose.

Fleur-de-lis from Nature.—Water Color.

Sketch in pencil and water color landscapes, animals, birds, insects, fish, and flowers suitable as motives for wall decoration.

Select a particular textile and make design for hanging.

Design textile panels for screens to be used in school.

Cut and apply stencils to hangings previously selected.

Use of a number of stencils for different colors.

II. Cooking and Home-Keeping—Girls:

Two forty-minute periods throughout the year

Food materials: what they are, where produced, why selected; action of heat, cold, fermentation, in making food digestible and developing flavor; cleanliness and order in work.

Study the effect of high and low temperature processes on starch, vegetable fibre, albumenoids, gelatine, fat, as shown in

the cookery of a fruit, potato, cereal, egg, oyster, tender meat, gelatine, breakfast bacon. The control of stoves and regulation of temperature.

Combine food materials in a starchy mould, sauce served with a vegetable, vegetable soup, custard, batters made light with air or baking-powder. Note effect of materials upon each other; work out proportions necessary to produce a desired consistency; weigh and measure accurately; manipulate carefully for thorough blending, smoothness, or lightness of mixture.

"Charge," Original Illustration.—Water Color.

Construct dishes of attractive form, from models or original designs; such as spinach, moulded and served with egg, sauce, and toast; make dish of meat or fish; salad; fruit and gelatine dessert.

Produce fermentation by favorable temperature in yeast bread; prevent fermentation by destructive temperature in canning fruit.

Cook meat and fish by broiling, roasting, and boiling to retain juices and develop flavor; by a low temperature process, to extract juices or to soften fibre.

Plan and serve a simple meal; select dishes, estimate quantities and cost.

Cleanse apparatus and articles used in connection with food; stove, sink, refrigerator, utensils, dishes. Give special attention to thoughtful handling of mechanical contrivances.

III. Wood-Working—Boys:

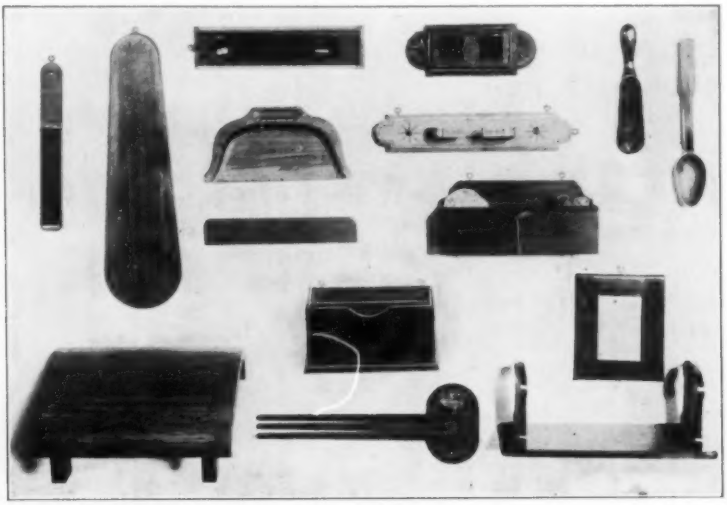
Two forty-minute periods throughout the year

Equipment similar to that of seventh grade.

The following models used as basis of course: knife strop, pen tray, ink-stand, salad spoon, letter-paper stand, footstool, book-rack.

Decorate by line grooving, chip carving, and oil or water-color singly or in combination.

Proceed as in Grade VII., giving increasing play to individual thought in character and decoration of model.



Bench Work in Wood.

Plan and make in co-operation three-part screens with textile panels noted above, to be used in the school.

Courses of Study in High School

FIRST YEAR

All work in the High School is given in studios or laboratories by special instructors.

I. Drawing, Painting, Modeling, and Design

Two ninety-minute periods throughout the year

Original Illustration.—Water color.

Study of action, form, proportion, light and shade, color and design. Memory and imaginative work. Picture study.

Materials: pencil, charcoal, water color, chalk, pen and ink.

Illustrate selections from literature by work from the posed figure.

Outline:—One value besides the paper; two values and paper; two values in rubbed charcoal: three values, etc.

Color in flat tones with outline; color in values, as above, by various processes (color laid over the whole; light taken out, dark laid in, etc.).

"The Children Sing in Far Japan."—Water color.

Study of the three orders of architecture; sketch from cast in pencil or pen and ink. Principles of design discussed; study of rhythm and balance for surface decoration; invention of units and "all over" patterns.

Design stencil, cut and apply to burlap or other textiles for class banner, basket-

ball pennant, or wall hanging; design posters for class games and entertainments.

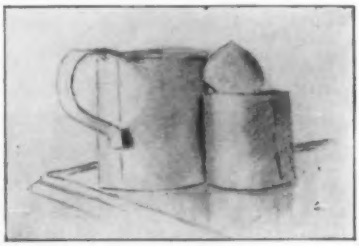
Select material and design decoration for hanging to be used with cabinet made in shop.

Original Decorative Panel.—Water color.

Color designs, proceeding from red, yellow, and black on gray paper to other color combinations.

Design decorative treatment for articles to be made in the shop involving line grooving, chip and simple free carving, outlines in oil color, pyrography, outlines filled in with color, and inlaying.

Model original designs in clay; study plants, animals, and the human figure in clay or plastiline.



Study in Black and White.—Three Values.

Study drawings and pictures by masters, with occasional lantern-slide lectures; various works selected for their art content rather than historical significance; American artists introduced; modern mural painting; significance of ancient and modern public art; endeavor to develop standards of taste in dress and home furnishing.

Mechanical Drawing — about one third of the year: Make working drawings of common objects, in part related to work in the shops.

First freehand working sketches, then pencil drawings with instruments, then inked drawings.

Plan and make drawings for simple one- or two-story building for a summer camp.

Consider dimensions, arrangement, and appearance rather than construction with girls.

Develop methods of construction with boys.

II. Food Economics and Household Work

In the first year of the high-school course pupils choose between Domestic Science and Wood-working.

Two ninety-minute periods throughout the year

Discussion, experimentation, and practical work.

1. Food Economics: relation of food to body in producing tissue and energy; money value of food relative to other household expenditures; production of food in the economy of the nation.

Separate the constituent parts of milk, eggs, grain; compare with other food materials as to composition; classify food materials according to their proximate principles.

Examine digestive tract of frog; develop fact that starch solution will not pass through membrane; digest starch with saliva, and note that it then passes through membrane; digest egg and meat with pepsin and hydrochloric acid; make emulsion of fat; test starch and albumenoids before and after artificial digestion.

Review in the laboratory the fundamental cooking processes as given in the Eighth Grade, with special reference to rendering of food materials digestible.

Make list of food materials, perishable and non-perishable; obtain prices from shops and newspaper quotations; note what group of materials is the most expensive, and the reasons therefor.

Discuss the functions of the food principles in nutrition; note that nitrogenous food is indispensable; discuss problem of providing this in inexpensive form.

Study dietaries of different nations, localities, and climates; study meals as ordinarily served in average family in this locality; discuss difference between breakfast, luncheon, and dinner, and between meals at different seasons; draw general conclusions as to what constitutes a suitable meal. Discuss the plan of a breakfast or luncheon to be served by class; estimate quantities for given number of people; show how cost may be increased or decreased by substituting other dishes for those selected, keeping the normal balance of food principles, and still making the meal attractive.

Set dining table; discuss arrangement, serving, and waiting; note that questions of good taste, comfort, and saving of labor are involved.

Prepare a series of typical dishes for breakfast or luncheon;

make working plan for preparation of a meal; prepare and serve the breakfast or luncheon.

Prepare and serve a dinner.

Discuss manufacture and transportation of food materials; food adulterations; how to buy; visit markets and manufactories in New York.

2. *Household work* in relation to health, appearance, and economy of time and labor.

Discuss cleanliness; note difference between waste material that may affect health, and corrosion or soil that affects appearance only; individual cleanliness; municipal cleanliness; work of the Board of Health.

Polish silver, brass, copper, nickel; discuss the nature of the corrosion and the hardness of each metal, and determine accordingly the proper cleansing materials; discuss means of avoiding waste of time in such work.

Cleanse glass in windows, in dishes and bric-a-brac, with discussion of principles. Cleanse tiles.

Cleanse paint and polish woodwork and furniture; discuss best materials for the purpose.

Cleanse stove and refrigerator.

Sweep and dust a room; select brooms, brushes, and cloths, and discuss their appropriate uses; examine dust through microscope; expose petrie dishes with gelatine culture to air of room before and after shaking a rug, and observe result from day to day. Discuss healthful furnishings.

Cleanse trap of sink with solution of lye; examine structure of trap, and plumbing throughout the building; note principles of physics that apply in plumbing.

Discuss disposal of garbage, ashes, paper, etc. Dry and burn table refuse in range; use the patent garbage cremator; discuss municipal disposal of waste, and how the householder may cooperate with the city.

III. Wood-Working

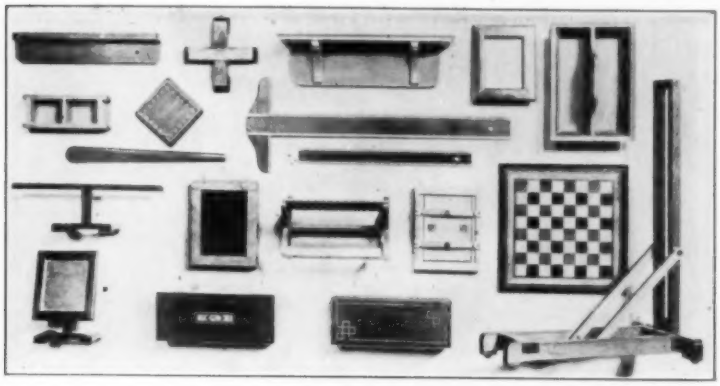
In the first year of the high-school course pupils choose between Domestic Science and Wood-working.

Two ninety-minute periods throughout the year

Bench equipment involving comprehensive sets of individual and general tools.

A high degree of accuracy and nicety of finish required.

Models used as basis of work: tool-rack, picture-frame, T-square, printing-frame, negative-rack, photograph-stand, bicycle-stand, decorated handkerchief-box.



Bench Work in Wood.

Consult individual interests in selection of projects involving similar degrees of difficulty.

Modify form and dimensions within given limits of size and structure.

Decorate by line grooving, chip and simple free carving, outlines in oil color, pyrography, outline designs filled in with color, and by inlaying.

Have each pupil design the decoration for his own models.

Design and make one original model.

Design and construct in co-operation cabinet with hanging noted under I., to be used in the school.

Through class-room talks, illustrated by maps and lantern slides, make a study of:

The distribution of lumbering forests in the United States;

The process of lumbering and the life of the lumberman;

The operation of the modern saw-mill;

The forms and ways in which lumber is brought to market;

Some of the main uses of the most important woods.

SECOND YEAR

I. Drawing, Painting, and Design (Elective)

Two ninety-minute periods throughout the year

Study from Cast in Three Tones of Charcoal.

Advanced work in action, proportion, and construction, light and shade, color. Advanced work in design. Memory and illustrative work. Picture study.

Materials: pencil, charcoal, water color, chalk, pen and ink.

Representation: Work in full values from the posed figure. Various processes in water color. Memory work with the pose, plants, and landscape from nature in color.

Construction of the human figure. Casts of various parts of same.

Design: Advanced study of principles; and problems of line, light and dark, and color arrangement.

Leaf from a Sketch Book.—Pastel, Gray Paper.

Study from Pose.—Charcoal.

Historic art: Study of Byzantine and Gothic art in a series of illustrated talks. Keep note-books with sketches. The aim of the course is to lead to a broader idea of the nature of art and to show the unity and relation of the arts of design, music, and literature.

II. Garment-Making and Millinery (Elective)

Three ninety-minute periods throughout the year

Sewing: Stitches needed in garment-making. The use and care of sewing-machines. Comparison of various machines. Practice in stitching, tucking, etc.

Consideration of cotton materials; widths, prices, values, and uses. Illustrate by samples and pictures.

Drafting and Garment-making: Undergarments—Cutting and making underwear; discussion of appropriate materials; embroidery and decoration; machine work, seams, tucks, placquets, and yokes; hand work in gathering, buttonhole-making, and finishing. Calculate amount and cost of materials.

Compare the value of hand-made clothing with machine-made; underclothing made for the trade. The bargain table; the sweat-shop; the Consumers' League. Discuss the manufacture of cotton goods. Illustrate by reference to manufacturing conditions, by samples of materials and pictures. Visit cotton-weaving mill. Discuss adulterations in materials.

Draft a shirt waist requiring careful measurements. Discussion of materials for use in shirt waists with respect to color, design, and decoration for various purposes. Cut, fit, and make shirt waist from pupils' designs.

Discuss hygienic and appropriate dress, especially in undergarments. Questions of economy, cleanliness, and beauty.

Millinery: Make bows, and discuss the effect of various kinds on the hats. Wire and line straw hats. Make and place folds on a hat. Study color and design in relation to the individual. Discuss materials suitable for decoration.

III. Wood and Metal Work (Elective)

Three ninety-minute periods throughout the year

For wood-working, benches as in first year and equipment of turning-lathes with tools.

For sheet metal work, benches with vises, hammers, shears, raising tools, etc.

For foundry, simple moulding benches, lead-melting pot, and crucible furnace.

Turn in soft and hard wood such models as candlesticks, tool-handles, dumb-bells, napkin-rings, boxes, towel-rings, bowls, and typical vase forms.

Some Turning Models.

Combinations of bench work with turning, and bench work with sheet iron and copper.

Decorate by processes previously used, but with freer treatment in grooving, pyrography, carving, and color.

Methods of finishing hard and soft woods.

Design and construct table of hard wood for use in new school building.

Make and decorate trays, bowls, and inkstands of sheet copper. Color by heat and by chemical processes.

Make one or two simple patterns to mould and cast in lead.

Make pattern of bell to be hung in the school. Cast in bronze.

Plan and construct small frame house in garden plot to hold garden tools, seeds, etc. Frame, clapboard, shingle roof, make fixed sash and frame, cleat door and frame.

Proceed in work as in first year, giving larger scope to development of individual ideas in design.

Bring to attention of class through cuts, photographs, and lantern slides examples of artistic construction in wood and illustrations of decorative treatment.

Study the structure and properties of wood.

Processes of drying and preserving lumber.

The principles governing wood construction.

THIRD YEAR

I. Drawing, Painting, and Modeling (Elective)

Two ninety-minute periods throughout the year

Clay modeling: Creative work in clay or plastiline; designs in relief and round for articles of use, with appropriate decorations. This work is a preparation for the wood-carving of the fourth year.

Representation in black and white and in color continued at intervals, amounting to six weeks of work during the year. Sketch-books kept showing examples of design, figures in action, and other objects of interest.

Historic ornament and architecture. The art of the Tudors and Stuarts and "colonial" styles are taken up in a series of illustrative talks. Fact developed that plastic art was once a prime mode of expression. Significance of the fine arts as the spiritual expression of a people and a period.

II. Mechanical Drawing (Elective)

Two ninety-minute periods throughout the year

Analytical drawing, development of surfaces of geometrical forms, intersection of solids, original problems.

Ship drafting:

Draw sheer plan, body plan, and water lines of vessel of given water line, length, and draught.

Make calculations as to displacement.

Discuss elementary relations between speed and carrying capacity.

Calculate center of lateral resistance. Make sail plan for single-masted rig, calculating center of effort.

III. Laundering, Home Nursing, and Household Management (Elective)

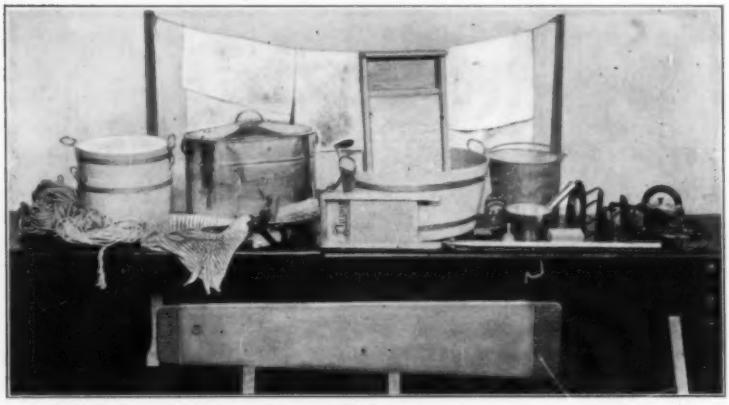
Three ninety-minute periods throughout half-year

Laundering: Discuss its relation to health. Discuss fabrics to be cleansed, and materials used in cleansing: water, soap, washing powders, etc.; methods used to make the fabric attractive in appearance and smooth to the touch.

Test samples of water for hardness with soap; note if hardness is removed by boiling; by addition of ammonia, soda, etc.; note difference between temporary and permanent hardness.

Test commercial bluings for presence of iron.

Remove fruit, iron, and ink stains, and grease spots.



Portable Laundry Equipment.

Wash squares of cotton, linen, and wool, in cool, warm, and hot water; boil other pieces, and compare with first for shrinkage; examine fibre through microscope.

Wash pieces of colored cotton and linen with soap, washing powder, ammonia; dry in sun and shade; discuss different dyes.

Wash and iron small white cotton and linen articles furnished by class.

Make starch of varying thickness. Discuss appropriate uses.

Wash, starch, and iron a shirt waist.

Wash silk and flannel.

Cleanse lace and ribbon; cleansing with benzine, etc.

Discuss equipment of a laundry; labor-saving devices in washing and ironing; municipal laundries.

Home Nursing: Discuss the duties of the home nurse; her dress; arrangement and cleansing of room; how assist the physician.

Make bed, insuring smoothness; lift patient and change pillow; change sheets with patient in bed; change clothing of patient; change position of patient.

Discuss and prepare food; peptonize milk, meat gruels; arrange trays for invalid; discuss method of feeding in severe illness.

Take pulse; test temperature with clinical thermometer; discuss symptoms that may be readily noted and recorded.

Prepare rolls of bandage; bandage hands, head, and arms.

Discuss treatment of burns, cuts, fainting, and other common emergencies.

Discuss duties of the trained nurse; the function of the hospital in modern life. Visit a hospital.

Household Management: Discuss duties of the housekeeper, and what knowledge she needs for successful management.

Examine house-plans. Visit cellars and houses in process of construction.

Plan furnishing of rooms. Economy in furnishing.

Plan household work for the week. Division of labor where servants are employed. Housework among tenement dwellers and on the farm.

Discuss household expenses, for those of limited means; for the well-to-do.

Keep accounts.

IV. Dressmaking and Millinery (Elective)

Three ninety-minute periods throughout the year

Underwaists: Draft, cut, fit, and make an underwaist. Discussion of materials, decoration, and cost of plain and elaborate underwaists.

Study of the beautiful and appropriate in dress.

Principles of design applied to dress. Illustrate by various examples.

Dress Skirts: Study silk, wool, linen, and mixed goods, with discussion of qualities, commercial widths, and expense. Linings and finishings. Draft, cut, fit, make, hang, and finish skirt.

Textiles: Industries and their economic relations. Process of manufacture. Adulterations of materials. Visit shops to inspect dress goods and upholstery materials; furniture, drapery, wall-paper, and floor coverings. Visit a furniture store.

Shopping ethics.

Millinery: Renovating old hats and materials. Wiring, binding, and trimming felt hats. Study of materials, color, and trimming in relation to the individual.

V. Forging (Elective)

Three ninety-minute periods throughout the year

Equipment of individual forges, anvils, and sets of tools.

Emphasis placed on decorative treatment of iron and scope given to individual design.

Make such articles as staple, hasp, door-hook, chain and hook, door-handle and knocker, fish-spear, drawer-pulls, chest-handles, candlestick, small lamp-stand, umbrella-stand, and fire-screen.

Design decorative treatment for several of the above.

Make, harden, and temper several steel tools, such as prick-punch, scratch-awl, ink-eraser, hammer, chisel, and one or two lathe tools.

Design and make in co-operation for tool-house, built by second-year class, strap-hinges, handle, and key escutcheon for door.

Design and make wrought-iron bracket for bell cast by second-year class.

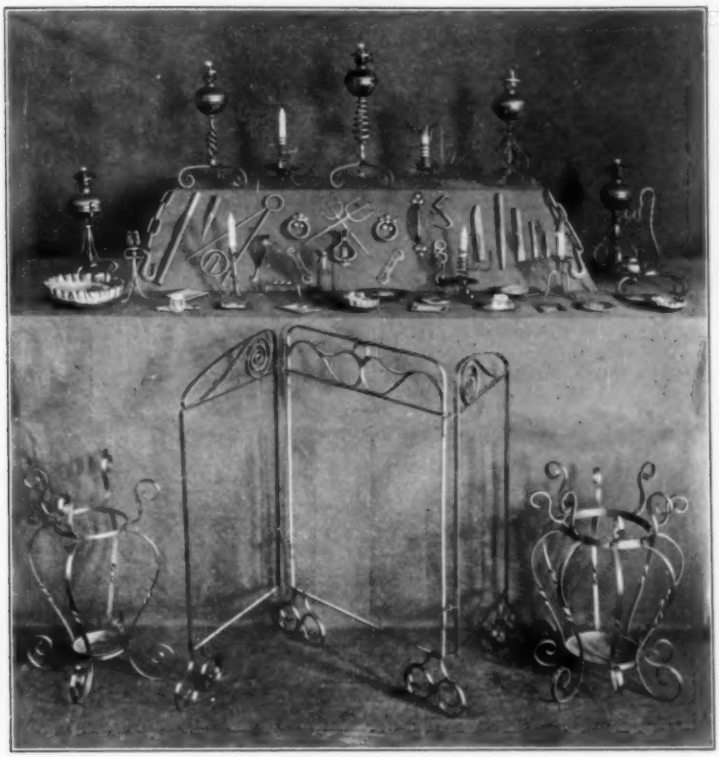
Design and make electric-light bracket for new school building.

Make a study through class-room talks, illustrated with maps and lantern slides, of the important iron and steel processes, as follows:

The nature of the common iron ores;

The distribution of coal and iron ores in the United States;

Relation to industrial development;



Forging and Sheet Metal Work.

The fundamental factors involved in the blast furnace, puddling, Bessemer, open hearth, and crucible steel processes;

The characteristics and important uses of the products of these processes;

The economic factors entering into these processes, and the tendencies of modern development.

FOURTH YEAR

I. Design, Composition, and Wood-Carving (Elective)

Two ninety-minute periods throughout the year

Constructive Design and Wood-Carving: Make various articles of wood, and treat decoratively by wood-carving. Also use pyrography and processes of staining in colors and plain tones.

Drawing is chiefly limited to the work of collecting motives, and draughting in connection with the above, although the pupils keep sketch-books and continue the practice of sketching from nature. Drawing from pose and cast, accompanied by memory work, for a period amounting to six weeks of work.

Historic Art: The art of the Middle Ages and the Renaissance (with especial reference to wood-carving) is taken up in a series of illustrated talks. Pupils take notes and illustrate such work with sketches in their note-books.

Importance of the art life of the Middle Ages; tendency of machinery to replace hand work at present time; value of the individual product; continued necessity for creative art.

II. Mechanical Drawing (Elective)

Two ninety-minute periods throughout the year

Make working drawings of machine details.

Design rectilinear and rotating cams. Original problems.

Study action of steam-engine slide-valve and work of steam.

Make working drawings of several details of engine to be operated in the machine shop.

Make assembly drawing of same.

III. Machine Work (Elective)

Three ninety-minute periods throughout the year

Equipment of benches with vises, files, and hand tools; engine lathes and other machine tools. Small vertical steam-engine equipped with ball governor, fly-wheel brake, and simple dynamometer.

Make such individual models as wrench, level, bicycle pump, and gyroscope. Execute simple designs in spun metal, such as card receivers, bowls, and reflectors.

In connection with work in the drawing-room, make a study of the structure and operation of the steam-engine.

Take apart and assemble such portions of engine as are necessary to understand structure. Connect and adjust valves with varying degrees of lap. Run the engine with different valves. Study steam distribution from indicator cards. Calculate the horse power from brake and compare with indicator cards.

Run section of shop by engine with tools idle and in operation. Determine amount of power absorbed in transmission and amount doing useful work.

Filing and Machine Work.

Make a study of the following :

Development of the steam-engine in the nineteenth century.

Importance in production and transportation.

The part played by machinery in modern civilization.

Characteristics of machine work as compared with hand work.

The principle of the division of labor as represented by machinery.

The tendency of improvements in machinery to replace manual labor by automatic devices, and its significance.

The Fine Arts

By ALFRED V. CHURCHILL,
Professor of Fine Arts in Teachers College, Columbia University

I. Aim and Value of Art Study

Art study in the public schools seems to be established almost beyond the point of controversy. There are, however, many thoughtful persons who still doubt the expediency of art training for the average man. In these days of questioning, when even the oldest and best-established studies of the school curriculum are called upon to prove their right to existence, it may not be amiss to state briefly the *raison d'être* of art work in public education.

Although the term "art" * represents the whole range of man's higher creative expression and is one of the necessities of his nature, yet esthetic development has sometimes been thought of as rather remote from the social ideal of public education. As a matter of fact, *no subjects in the curriculum stand more securely than the art subjects on the basis of social efficiency.* The truth of this statement may be considered under the following topics: (1) The powers cultivated by art study; (2) the importance of the arts of design as a medium of expression by the child; (3) the fact that an educated public taste is a basis of national wealth; (4) the significance of the arts of design in the race achievement; and (5) the educational value of the point of view inculcated by art study.

The educational value of drawing is pretty generally recognized. We have yet to hear of a school in which it has been

* The term "art" is here used both in the narrower sense, as representing the arts of design, and also occasionally in the broader sense, to include all arts; it will not be difficult to decide which is meant. The expression, "the art subjects," is used as a general term, in absence of a better, to designate the branches often taught by the "drawing teacher," viz., drawing, painting, and modeling, design, history of art, mechanical drawing, and even "making."

fairly tried where its worth has not been demonstrated.* The training offered by the art subjects is unique in character. As modes of self-activity they take their place on somewhat the same plane as manual training. In fact, the two branches are so closely related in their nature that the line of demarkation is, and should be, hardly recognizable. Clay modeling is manual training. Construction is design. Drawing cultivates not only the brain and the eye, but the hand. In affording opportunities for cultivating the power of observation, the art subjects occupy a province of their own; and in the development of the visual imagination and memory, which powers form so indispensable a part of the student's equipment for life, they hold a place which nothing else can fill. Fundamental conceptions of mathematics are intimately bound up with study of form and proportion. It is doubtful whether ideas of fractions, dimensions, cubic measure, etc., can be thoroughly comprehended by the child without pictorial or constructive representation. At any rate, the teacher finds in these processes one of the natural introductions to number work.

A large number, probably the larger number, of our words and thoughts refer back to sight impressions. Without the corresponding visual image (or, at least, the power to summon it at will) words become mere empty sound. To refine and strengthen the visual image is a fundamental problem of drawing.

The value of the art subjects is far beyond any set courses in these subjects. Drawing, painting, and modeling have a very broad significance running throughout all the work of the school. As has before been pointed out, their expression differs from oral or written work in presenting certain systems of facts and ideas with greater vividness and clearness. The child's form or color expression of a flower, an insect, a geographical slope or a geometrical concept, is certainly more precise and definite than

* Cases of failure can usually be traced to some extrinsic cause,—sometimes to lack of character or general education, but almost invariably to insufficient art knowledge on the part of the teacher. Being one of the youngest subjects in the curriculum, its importance and the extreme difficulty of teaching it have frequently been overlooked by School Boards guiltless of esthetic knowledge. Time was (and is not many years removed) when a teacher of penmanship, with three months only of practice in drawing, could be held eligible for one of the most important supervisory positions in the country. That time is happily passing away.

any possible verbal expression. The teacher is enabled as in no other way to get at the child's precise point of view in a multitude of subjects. Not only is the child able to use these forms of expression as a valuable auxiliary when language fails; not only is he able to express thoughts in form and color, which would find no outlet whatever in language; but we find them fulfilling a still higher function in the expression of the intimate personality of the child. Through them he can utter his inmost self, giving voice to his creative imagination. There is no fact about child life more surprising than the capacity for appreciating beauty of form and color and acquiring the power to produce it. And the farther we penetrate into the real possibilities of the children, the more we are convinced that the power to imagine and create exists within them if we could only get at it before the bloom is rubbed away in the sordid hurry of life. Admiration is frequently expressed by professional artists of the simple, unpremeditated beauty of the work of children whose technical power has been developed without their having been spoiled by self-consciousness.

The Conflict with Mudjekeewis.
"From his eyry screamed the eagle, The Keneu, the great war-eagle."
Original illustration in color. Second grade.

In illustration of poems and stories the work of children six or eight years old often takes on an epic dignity which causes a smile when it is recognized. These things, full of apparent absurdities, are to the child the living expression of a real thought. They represent, not inadequately, his knowledge, his limitations, his powers of conceiving and feeling. They are as important to him and his development as the perfect expressions of art are to those who produce them. And then there is the expression of that native longing of the soul for order, for harmony, for the beautiful; those qualities which enter into all essentially satisfactory expression, but which exist in perfect purity in music and the arts of design. And childhood is the time to get at them. In childhood the natural instincts of the race for these qualities may be satisfied with permanent results in refining the character. A love

for harmony and truth may be induced which shall extend in greater or less degree to every achievement of life.

In the art subjects, also, are found in great abundance those opportunities for the expression of the social sympathies through making for the home or for the schoolroom things which are at once useful and good to look upon.

We must not leave this topic without mentioning the important mode of self-expression (which is more often misrepresentation) which every human being has forced upon him in the fact that, whether he will or no, he is compelled to the use of form and color every day of his life in his dress and surroundings. It is not less vulgar or less degrading to use glaring and offensive color combinations or bad forms in dress than to use corrupt English. Even the opponents of art education are ready to admit the importance — importance even to the national morality — of having the homes of the people attractive, beautiful, simple.

But there are practical men, occasionally, who go so far as to ridicule the whole notion of art education for the people, and, speaking of drawing as a "frill" or a "fad," maintain that in the practical education of our citizens there is no place for that kind of work and no money to waste on it. Such an opinion can only be held in ignorance of the fact that art education rests on a sound economic basis. Official reports of the bureaus of commerce and industry of Europe have proved this. The evidence is impregnable. The question was closed nearly half a century ago. In fact, the basis of the original introduction of art in our public schools was the economic argument which has of late received but little attention in discussions of the subject.

France, England, Germany, Austria, vie with each other in founding schools of design and improving upon courses of study and management of schools, knowing that an important advantage gained will frequently repay the money invested even within ten years.

The secret of all this, of course, lies in the fact that drawing is the foundation of industry. Everything has to be drawn or modeled,—the dress and the pattern of the goods, the jewelry, the lace, the picture, or the statue, or the palace with all its articles of use or luxury, the dishes, and beds, and chairs, even the crowns and the thrones. We produce cotton and wool or metals in the raw state at a living wage, and export them to

France to have them returned to us in a few weeks doubled or trebled in value — by what ?— *by the addition of taste in design.* Even a surgeon or a dentist demands in his tools qualities which only an art training can produce. Other things being equal, he will choose the most artistic thing, always; and as the taste of the people advances year by year this will be increasingly true.

Beyond this remains still the consideration that the designs produced by the genius of the few must be executed by the hands of thousands, of millions, of working men and women who must, in their turn, have an intelligent comprehension, and to a large extent a practical knowledge of drawing. Shall the tasks which demand the greatest taste and skill be given to others while we do the coarser work ? Shall these enormous expenditures of capital be made within our own boundaries, or in foreign lands ? *

Yet the class of men whose occupation demands a knowledge of drawing (although numbered by the million), after all, is only a part of the people, and a plausible objection may be made at this point, that if art training is an economic necessity, it at least need not extend to those who can make no use of it in after life.

In times when the people were unlettered, when knowledge was in the hands of the few, and when art depended on the patronage of kings and princes, this argument would have had much weight. But the genius of democracy is radically different from that of the feudal state. Greatness in any line of thought can, with us, only be a result of national culture. This is a universal principle. The quality of our best thought in philosophy, science, politics, art, or education—even the scholarship of our universities—must finally depend on the character of our national culture and of the work in our public schools. We cannot avoid the issues of our qualities as a free people, nor should we ever wish it. †

* It is not difficult to understand the financial advantage of beautiful buildings and objects of art. Behold the millions of francs which pour annually into Paris from American pocketbooks alone. Take away the element of taste from the fine jewelry and silks, the dress patterns and laces, and the shopping capital of the world would be deserted. Let some one estimate the wealth that the possession of a single work like the Venus of Melos or the "Marriage of Cana" has meant to the French metropolis. Hundreds of thousands perhaps, annually, from visitors and the sale of photographs.

† Suppose it to be greatly to our national advantage to raise up a generation of good writers. It might perhaps occur to some rich philanthropist, or some

We have considered thus far the educational value of the art subjects in developing the various mental powers; the importance of drawing, modeling, etc., as an auxiliary form of expression for the other subjects of the curriculum; the expressional value of these subjects in giving utterance to the personality and creative imagination; the necessity of form and color expression through dress and surroundings imposed on all throughout life; and the fact that art as applied to industry is a basis of public wealth.

The expressional and economic grounds are important enough by themselves to insure the introduction and retention of art study in public education. But there are arguments remaining which are of even more far-reaching significance than these. The commercial argument may be the one which will make the strongest appeal to the average citizen of our practical age and clime. In the hurry and rush of this modern life, our tendency is undoubtedly to idealize outward prosperity. We seek first the mammon of this world and its unrighteousness, hoping vaguely that other blessings will be added unto us. It is more than difficult to realize that the building up of the character of a real humanity is of more lasting importance than fine manners and clothes, and perfect organization, and rapid transit, and speedy acquirement of wealth. It is hard to believe that "the world is too much with us" and that

> "Getting and spending, we lay waste our powers."

But when we allow ourselves to think calmly, we go back instinctively and inevitably to the great, full, rich ideals of life.

body of very modern statesmen, that the main thing to do would be to establish at Washington a plant of $50,000,000 for the foundation of a National School of Literature. The thoughtful man, however, perceives the futility of any such scheme—at least, the subordinate part it would have to play. The only hope for a great national literature is the cultivation of the love of letters in a great people. Let there be a high average of culture among the people, and the rest will work itself out according to the law of averages. Once in a hundred, perhaps, there will be a man of unusual ability; once in a thousand, a genuine talent; once in a million, a genius. We do not expect thorough language training to create geniuses; but we believe that the average man may rise to some sense of the beauty of his mother tongue and the dignity of human speech; and if we are found worthy to take care of this, Heaven will take care of the geniuses. This, which is true of literature, is true of all the other arts.

We are ready with the Greeks to accept the threefold perfection of body, intellect, and spirit. We find ourselves naturally thinking with them that the rush after vulgar objects of pursuit, to the exclusion of high objects, is a manifestation of barbarism. Surely it is not possible that human beings, worthy of the name, should be contented with the kind of education which prepares them only to gain shelter and food! What kind of "preparation for life" is that which provides for nothing but animal necessities?

The one overwhelming argument for public art education is *the power which it has of enriching life and adding to human happiness.* The sources of innocent pleasure are not so many that we can afford to turn young men and women out into the world without offering them the gifts which are (measurably) within the reach of all,—the thought and the art of man and the beauty of nature. The love of the beautiful is the most potent of the forces which make for culture and bring into the character the elements of "sweetness and light." The mere fact of enjoying some thing of beauty which others enjoy has about it an impersonality, an unselfish note, which places it on a high plane of living. Here is a bourne where jealousy need not enter.

An unending possibility of pure delight is open to those who have learned to see the charm of nature's changing beauty of form and color, to produce which

> "God's bright and intricate device
> Of days and seasons doth suffice." *

It would seem as if mere contact with beauty were sufficient to evoke the response within the mind of man; but the blindness of the average observer to all refinements of color and form indicates that the appreciation of the beautiful is not to any great degree original and spontaneous with the individual. The farmer lives all his life in contact with nature, but he does not perceive the beauty of the flower or of the storm cloud. The development of color perception revealed in the historic study of landscape painting demonstrates the fact that such perception is a gradually accumulating part of the race inheritance.

There are few who are totally incapable of development along these lines; but there are likewise few who, of their own initiative, would attain esthetic appreciation. It is one of the great

* Robert Louis Stevenson.

privileges of art education to open the eyes of the student to the beauty of our physical environment, to which we sustain a relation intimate beyond words. Science is able to tell us that the Greeks would not have been the same free, noble, and creative people without their climate and their mountains. There is a geography of the soul that tells us we should have been another race without the color of the grass and the everlasting blue of the sky.

Learning to see and love the beauty of nature is the first step to a knowledge of that precious legacy of the race which has been committed to canvas and marble, and embodied in the art of the builder. It has long been found possible for the people to draw freely upon the sources of thought in the art of the written word, and now, like a new continent, comes the discovery that they are not less able to understand that of the pictured space and the living stone. Thoughts in form and color are more easily apprehended and more universally understood than those of spoken language.

The human being comes into self-knowledge through seeing his potential self mirrored in the acts and feelings of others. Moral character is made up of a series of conscious or unconscious changes in consequence of recognitions of qualities which one admires (or detests) in those about him, so that no man liveth to himself or dieth to himself. The range of these recognitions and reflections is carried outside the petty range of individual experience and extended to the whole race experience, through contact with imaginative literature and history, music and the arts of design. Through these channels man becomes completely identified with the race.

And what shall we say as to the comparative importance of the arts of design in this race achievement? The superior number and vividness of sight impressions to all others offers a strong indication of the place occupied by the arts of space and color. The thought that these arts are inseparably connected with architecture and the manual industries is a further indication. The fact that there are complete systems of form and color thought, incapable of expression through language, and offering prototypes of word symbols, has already been suggested.* In the great

* There are systems of ideas as definite as those expressible in language which are not to be expressed in word symbols at all. The sonata or symphony and the scheme of color, the beautiful lines of a statue, or the waves of the sea, are examples.

culture epochs we find a tendency toward correct and powerful expression in form and color as well as in language. A multitude of the choicest spirits of all time have found in them their natural means of expression, and have poured their genius into these moulds. Much of man's profoundest thought and most penetrating insight into his own nature and relations, and much of the history of the race, has been written in this character and is incomprehensible without it. So forceful and potent are the expressions of the arts that it is quite impossible to conclude what love, religion, or patriotism would have been without them. A single picture or a strain of music will change a man's attitude toward his day's work; it may color his whole attitude toward life.

Our last thought is one which concerns the point of view of art study.

The large and dignified humanity differs from the low-lived chiefly in its associations and imaginings. The elemental facts of life are much the same for all. Without the noble human imagination, a home is a place to eat and sleep in; love is animal gratification; a mother is a female with offspring, and the "grave is a hole."

The whole life and attitude of art is the living contradiction of such vulgarism. Nothing is common or unclean. The very utensils of the barnyard suggest beauty to the painter. The true architect is a spiritualizer of dead stones; the door he builds is no mere aperture for the egress of the body,—it is an animate expression of hospitality.* "The true humanity has a genuine interest in all the details of life, elevating them by art." The honey and milk of the poet are fragrant with thoughts of pastures and flowers and childhood. The "flower in the crannied wall" is a summing up of human thought and hope.

The perversion of this sort of association of ideas may result in maudlin sentimentality. To lose it out of human life is to leave at best a brutal intellectualism. It is the portion of the fine arts in education to yield that view of things which regards them as

* This statement, which may strike some as fanciful on first view, is literally true. The entrance of the Gothic cathedral is several times as high as it need be. Beyond its real height, the artistic emphasis of its structure carries the idea up perhaps twice as far again. The sides are cut widening like open arms, and the profuse plastic decorations call upon the attention until the *idea of entrance* is one of the most prominent in the whole architectural effect.

wholes and invests them with beauty. The studies which address themselves exclusively to the intellect have, hitherto, absorbed a large share of attention; the analytic and the material standpoint is sufficiently represented. True education must provide both the scientific and the esthetic points of view.

In the above pages have been put forth some of the broadest claims that can be urged for any line of human activity. It has been maintained, first, that through drawing and its allied subjects, it is possible to give a development otherwise lacking to the visual imagination and memory, and to aid powerfully in the development of the social nature; second, that the cultivation of the public taste is an economic necessity which will repay all reasonable outlays in actual money values; third, that the arts of form and color are an inestimable part of the expressional equipment of the individual child as they are of his race, enabling him to express himself fully and accurately where language fails, yielding new possibilities in the utterance of the creative imagination; and finally, in suggesting the part that the arts of design have played in the spiritual achievement of the race, and the profound necessity in education of providing for the point of view represented by the arts, we have claimed the birthright of every human being to his portion of the race inheritance in art.

If these claims are granted, it is certain that the subject of art education rests on no insecure basis, whether considered in respect to the full and harmonious development of the individual, or in relation to his social efficiency.

II. Method in Art Training

If there is a single inexorable moral principle that applies to every line of human effort, it is *that there is no excellence without painstaking work.*

The ignorant invariably show a tendency to imagine that art work offers an exception to this law. Success in any line of creative effort is ascribed to *genius.* A superficial observer, charmed by the dash and vigor of the great masters, and perceiving no evidence of discipline or restraint, stupidly considers these qualities to be the spontaneous product of the creative spirit.

It has become common in late years, as the creative possibilities of childhood have been unfolded, to commit a similar error in

regard to them. The serious purpose and strenuous discipline required in other subjects is relaxed, partly because the training of the grade teacher in art is far inferior to that in other subjects and often entirely false (through no fault of hers), and a slovenly, slipshod piece of work is allowed to pass muster under the banner of "free expression," "emancipation of the child," and the like. Thus the subjects which, above most others, demand a concentrated discipline of all the powers are treated as a sort of play which the child may very likely enjoy until he is old enough to think. Then he perceives that he is making no progress; he is bitter and disgusted, and he has a right to be. The same thing would happen in arithmetic if children were suffered to play forever with that.*

It is, however, urged seriously by brilliant theorists, who are usually not draughtsmen, that the toil of correct drawing is a thing too difficult for the young. It is also stated that the severe use of method in representation destroys the artistic freedom and spirit of the child. The writer, on the contrary, is convinced that far from destroying freedom of artistic expression, *sound method is the only basis of artistic liberty.*

One of the crucial questions for the future of art in the public schools is how to secure that discipline, through which alone worthy results are possible, without losing that fine freedom of the individual spirit which is the life of art. Nothing is further from the writer than the temerity of supposing he is speaking the final word on this subject. Drawing is one of the youngest subjects in the curriculum of the public schools. The capabilities of the

* An artist, interested in children and accustomed to teaching them, went with a school-teacher to inspect the drawings of the public-school exhibit in the World's Fair of 1893.

The work of the elementary schools appealed to him strongly, but he was bitterly disappointed in the upper grades. "It has no life, there is no progress. It does not fulfill the promise of the younger children's work. The work of the older children is execrable."

A similar feeling has frequently been expressed by principals and others who, versed in education, while confessing an ignorance of art, still have felt that there was "something wrong with the work of the seventh and eighth grades." There are, of course, other causes to be taken into account. But there is no intrinsic reason which should prevent the work from growing distinctly and steadily from the first grade to the fifth, and from the fifth straight on to its climax in the high school. The tendency to a break in the fifth year can be reduced to a minimum.

child are still imperfectly explored. The whole subject is still in the formative stage. The teachers' ideals have changed radically within ten years, and are likely to be greatly modified in the future. Revolutionary changes, whether for good or bad, are taking place in the instruction of the art academies. The guide-boards of the times indicate with much uncertainty the proper methods of training the professional art student. The ideals of the art teacher in the public schools and those of the professional artist will be much more closely related in the future than in the past, and will react strongly upon each other because the art students of the present will become the teachers of the future.

Any statement of method must therefore be regarded in a tentative light. All that can be claimed for the work outlined below is that it embodies the best results of our experience up to the present time. To begin with, then, *we cannot hope to attain any worthy results without gradually building up the power to work hard;* we can never arrive at anything by continually playing at drawing any more than we can in other studies. In fact, at certain stagès of the course, to give the child a good habit of procedure is the most important thing to be aimed at. This is probably true of all studies, but in drawing it is quite liable to be overlooked.

The great mistake of the past has not been the lack of discipline, but the wrong kind of discipline. Perhaps the more prevalent mistake of the present time is the absence of discipline. Teachers, disgusted with the barren results of a method which substituted the teacher's theories for the child's observation, have rushed to an opposite extreme, and careless, irresponsible work has too often been allowed to take its place.

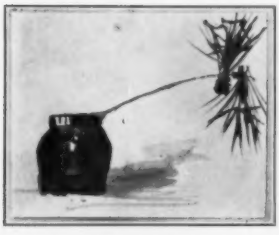
If there is one thing certain, it would seem to be this: that, *as the child advances in maturity, he must cease to draw like a child.* We recognize the fact that, especially in the first four years of school, there is danger in forcing mature methods on minds not ready for them. If, however, it be granted that a child of six years should think like a child and draw like a child, it is equally true that at fourteen he should have learned to put away childish things, and draw very much like a man. In the first part of the course, then,

Imaginative Drawing.—First Grade.

the work will give emphasis to "free expression"; in other words, "it is play under the intelligent guidance of the teacher." One of its great functions will be to develop and give outlet to the imagination. In the seventh and eighth grades and in the high school it will be no longer play. Pleasurable it may be; less difficult than other subjects it can never be. A good artist is the hardest worker in the world, and his studies continue to the end of his life.

The second main principle is this: *the work must be based upon observation.* This statement is trite, but the principle is constantly violated. If models are habitually placed a certain distance below the eye, habit will soon take the place of observation. If the teacher gives *rules* about "ellipses," "lines above the eye slanting downward," "lines below the eye slanting upward," etc., this takes the place of observation. One of the most important things to be learned throughout representation is to keep (or having lost, to regain) the "simplicity of vision." Our whole life training militates against this, because we connect our experiences and inferences with these impressions. What we want to teach the child is the power to see and to know what he sees. Theories and rules, which are substituted for seeing, are like a crutch to cripple the normal power of the child. For teaching the theory of perspective the high school is early enough.

Bittern from Mounted Specimen.—Fourth Grade.



Spray of Pine—Color.—Fourth Grade.

Any objects to be drawn, then, are placed above the eye, below the eye, on a level with the eye, in all conceivable positions.

The next point is to *assist observation by means of certain more or less mechanical processes.* The power of simple sight has been lost by nearly every one. We must try to regain it; we must lead to self-criticism and enable the pupil to find out what his eye does see. There is nothing new in the processes here mentioned;

they are used by artists the world over. It has sometimes been thought that work in the schools can be done in some other way. We believe that there is no other firm basis of progress for the average pupil. The processes noted below are, of course, used in various ways, but *the habit of thinking in these terms is the most important part of the discipline of drawing.*

Water color from Life. —Sixth Grade.

1. The habit of blocking in the masses, getting the whole before the part.
2. The habit of getting size and placing well calculated.
3. The habit of pencil measurement.
4. The habit of observing and testing perspective lines.
5. The habit of testing the whole drawing by vertical and horizontal tests and produced lines.
6. The habit of drawing by judgment first and measuring and testing afterward.

Costume Pose. Flat Treatment in Color.—Sixth Grade.

The matter of blocking in has frequently excited opposition on account of the difficulty of teaching it. The significance of this process, in its essence, is the procedure from the whole to the part, from the simple to the complex. It does not necessarily mean compelling the child to block everything in in rigid, straight lines, but it does mean, from the beginning to the end of the drawing, a calculation of masses, getting the whole before the part. It is doubtless impossible to teach blocking in to very young children. It would probably be foolish to attempt it below the fifth grade; but it may be begun successfully in the sixth and seventh years of school and in all mature classes, such as those of intending teachers in normal schools, it should be insisted upon absolutely.* By

* That is, as a habit. This does not mean the exclusion of free, rapid work

the eighth grade, the child's method should be so well established that it should not so much as occur to him to draw fingers on a hand, until the proportions and directions of lines in the whole hand have been indicated; nor features in a face, until the head as a mass has been blocked in. The matter of size and placing is of great importance as a means of discipline to the eye. It is also the elemental problem of composition and, as such, is to be insisted upon.

Pencil Drawing from Cast.—
Seventh Grade.

The habit of pencil measurement is found of great value by nearly every pupil. It may be taught in the fifth year of school. There is occasionally a pupil who is not able to accomplish self-criticism by this means.

One of the few dangers in using these mechanical means in assisting the observation is in the possibility of their abuse as a substitute for direct observation and feeling. If mechanical measurement is habitually allowed to precede drawing by judgment, the power of the eye becomes crippled; just as a healthy limb might do if a crutch were used.

Figure from Pose, Horse from Imagination.
Pencil Drawing.—First Year High School.

The above points, applied to the observation of nature and inculcated as systematically as would be the fundamental processes of arithmetic or algebra, are found

without calculation; in fact, such work is indispensable throughout the course. It is true of drawing, as of many subjects, that it can only be successful through hard work, even drudgery. It is also true that the most successful results will often be done easily, without apparent effort. Successful language teachers have found this to be true. Both kinds of work are necessary.

to yield results to a high degree educative. Acting upon this, our experience thus far has been that there is a steady growth upon the "free expression" basis to the end of the fourth year; in the fifth, a slight hiatus seems to occur with the introduction of more conscious method. From this point on, however, the work gains steadily on the gradually maturing basis, and reaches its natural climax in the high school. It seems to us that this successful result may occur in spite of all bad influences to the contrary, such as the recognized lapsus that occurs from the eleventh to the fourteenth year in which the child's life and interests are temporarily in a peculiar condition. Pupils who have had the proper training through several years of school life are prepared to continue the use of their acquired powers as teachers, in the draughtman's office, or in other employment demanding drawing, without having to unlearn anything or begin over again. Without such discipline, it seems to us impossible that the respect of the artist profession should ever be gained for school work; and we believe that the judgment of no one should have such weight with us in these matters as that of the artist.

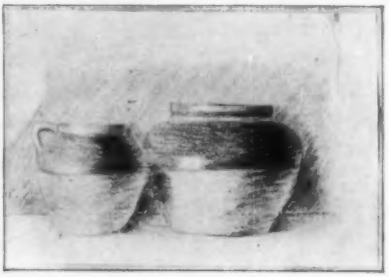
The foregoing thoughts presuppose the vast importance of outline work, a thing unsympathetic to little children, and that might almost be disregarded until the fourth year of school; but which, from that time on, becomes more and more important, and, throughout the later years of the course, assumes a large share of the time devoted to drawing.

Drawing in Two Tones.—
First Year High School.

And now what is the natural outcome of the above methods as applied to representation of light and shade and of color in black and white? In the first place, children enjoy color before they see light and shade. It is well to let the first spots of dark represent the most *obvious thing*. If the pose before them has black hair, the spot of black adds great interest to the outline drawing, without involving the student in the difficulties of light

and shade. A great deal of profitable work can be done in flat tones of color applied to drawings of the figure and animals, introducing the element of color without the difficulties of representation in color values.

When the light and shade studies begin, the first great thing is to get *the darkness as a whole separated from the light as a whole.* We endeavor to present the difficulties one by one, so as to give the pupil the ability to "think in an orderly manner" in regard to his work. The most natural step, after blocking in the contours of the shadows as a whole, is to execute the drawing in two tones (one besides the paper). This may be done in black ink on white; black ink on a gray paper; one gray tone of pencil or charcoal on white or gray paper, etc. A surprising amount of truth in representation can be obtained in two flat values with outline. The next step is to use two tones of gray and the paper, *e. g.*, two tones of pencil with white; one tone of pencil and one of white chalk on gray paper, etc. Then three tones of rubbed charcoal (flat tone of charcoal all over the paper, lights taken out and darks laid in, etc.). The work in all these exercises is kept in as simple and flat tones as possible. More complex values may only occur as variations on the simple tone, which is laid first. This is only the carrying out of the principle of *the whole before the part.*

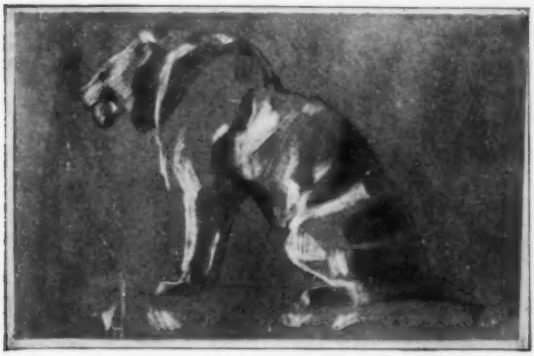


Drawing in Three Tones.—
First Year High School.

We have referred above to the common error of substituting the theory of the teacher for observation. This error has frequently been committed in introducing light and shade. When the teacher says that there are three values, "light, shade, and cast shadow," he is substituting his theory for observation (worse still, he is falsifying—cast shadow is often lighter than shadow). In the method indicated above, the whole truth is not told in any instance, but the truth is told as far as the limited means allow it.

One great question of method is that of giving the drawing a "motive," so as to get it near to the child's life. The possibili-

ties of drawing as used in connection with language and nature studies and with other studies are not nearly exhausted as yet.



Three Values from Cast.—First Year High School.

We are continually working to get the drawing, so to speak, off the paper and into life; we wish to make it express the real life of the child, and not merely his school life; the connections with "making" above referred to are being worked out more and more.

And yet the motive in drawing does not necessarily lie in its connection with other subjects. It is true that children are much interested in drawing a pose or a group in costumes (improvised with crepe paper) to illustrate poems and stories. But what if they are also interested in drawing one of their own number in his own proper clothes? If this is done in accordance with the principles of taste, that is to say with art, we should, perhaps, feel all the more certain that we are progressing toward the true end of our study.

Three Values from Life.—Second Year High School.

By a singular irony it is easy for the art teacher to forget the only thing which makes drawing really worth while; namely, *the art of it.* The cultivation of the power to imagine and express in the best way is the end and aim of the subject. We must develop artistic

feeling. Drawings by great masters similar in execution to those the children are doing should be placed where they can be seen constantly. The reproduction of one of Millet's drawings made with the end of a burnt match for his grandchildren, cut from the pages of a magazine, may do the children as much good as if it were an original and had cost a thousand francs.

Things placed before the children to be drawn must be beautiful. We find that it is just as possible to cultivate the power to see and right methods of procedure in connection with plants, animals, or the human figure, as it is with the abstract type form, or pots and pans, which are to children comparatively meaningless. We do not abandon these, but they are relegated to a very subordinate place. Children are human beings (a fact sometimes forgotten), and the human subject appeals to them. Moreover, they are full of imagination, especially in the earlier years, and this perhaps would continue if we only knew what to do to preserve and develop it. Imaginative work, therefore, forms a most important part of the study throughout the course, while in the earlier years it occupies the larger share of the time. Memory work has become increasingly important. Through it alone can the material for free imaginative work be assembled. In the earlier years of the course most of the representation becomes practically memory work.

Decorative Treatment of Chrysanthemum.—Eighth Grade.

There is nothing truer than that representation may be very excellent without attaining to art. Art may, on the contrary, exist quite apart from representation. In the Turkish rug and certain primitive potteries we find the latter condition. We may therefore consider the arts of surface design absolutely as an ordering of lines, spots of dark and light, or of color, in such a manner as to give pleasure to the eye, just as sounds ordered into music charm the ear. The difficulty and importance of representation cause it to usurp a large part of the time devoted

to art study. In the study of design and composition comes the opportunity to think of beauty almost entirely apart from any outside considerations. In introducing this subject, we have hitherto had to rely exclusively upon the feeling of the teacher giving the instruction. It may be possible in the future to further systematize instruction in line and color, and to teach designs based upon principles more tangible than any which can be stated at present. Up to this time we feel that the attempts to do this have to a large extent been failures.

Decorative Treatment. Red Lily on Green Ground.—Eighth Grade.

Method in design, with us, means simply the analyzing of the difficulties by the teacher so as to present them to the children one by one, thus teaching them to "think in an orderly manner" with regard to their work. Simple line arrangements come first; afterwards arrangements of dark and light spots (*notan.*); and then, spots of color, beginning with black and white and gray; then the same with a single color of red or yellow, etc., and later continuing to more complicated combinations. We have not used any color charts or extensive nomenclature of colors, nor any naming of color harmonies.

Original Design in Color.—Eighth Grade.

Constructive design is attempted in connection with constructive work in manual training, and in this direction unquestionably lies one of the great possibilities of the future.

Domestic Art in the Horace Mann School

By MARY S. WOOLMAN,
Adjunct Professor of Domestic Art in Teachers College, Columbia University

The study of the rise of primitive races shows that household activities were important factors in their development. Spinning, weaving, rope-making, netting, basketry, sewing, garment-making, embroidery, and the designing for all of these purposes were common tasks then as well as now, and assisted in giving mental power, moral stamina, and ideas of beauty to the workers while also ministering to their comfort. In our colonial days these same household duties had a large share in developing strong, resourceful characters, and thus were of value educationally as well as economically.

Domestic art has chosen for its special study certain groups of home interests as being important in the manual-training field. As these industries furnish a large part of the world's work to-day, their use in education should lead to increased social efficiency in the pupils. The needle belongs to the everyday experience of the child, and represents one of the most common activities of life. It is not only the personal independence of the worker herself that may be gained, but her ability and inclination to lend a hand in useful and needed directions.

Many of the economic questions of the home are also important social problems. The effect of the home environment, the properties and values of textile materials, the influence of the consumer's ignorance on the manufacturer, sweat-shop labor, the relation of the consumer to employees in dry-goods shops, and subjects of a similar nature are problems in domestic art. The understanding and appreciation of the work of great masses of the people also lead to sympathy for the worker and respect for honest hand-work.

The subjects included in domestic art give opportunity for good courses of hand-work in the lower elementary school as well as in higher grades. They offer objects for construction which

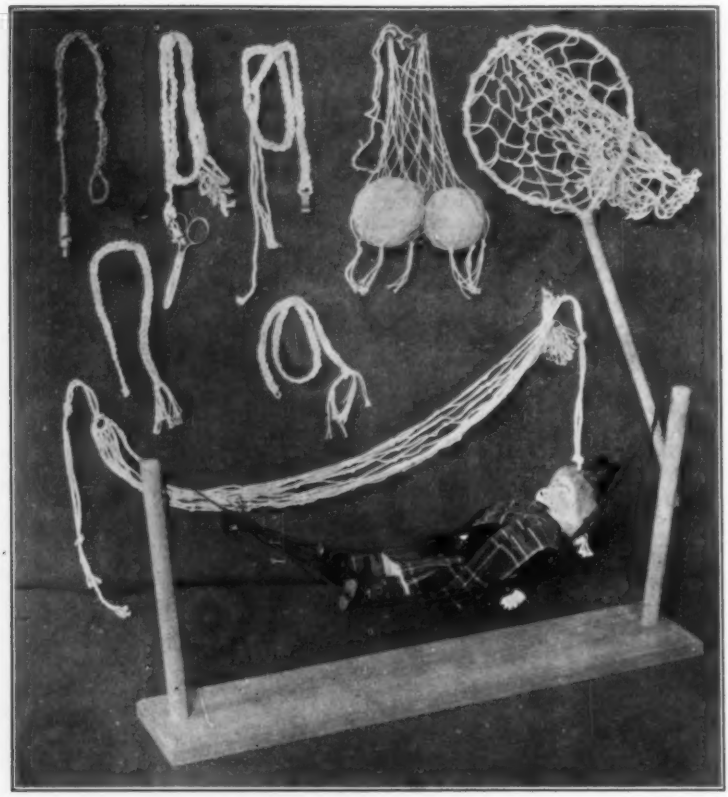
strongly appeal to everyday interest and lead to self-expression in important directions; to the mastery of tools and of materials constantly needed in life; to variety in thought and construction; to objects which demand of the child the balancing of cause and effect and which may be rapidly completed without strain on the nervous system.

In the Horace Mann School domestic art is trying to realize its special aims as well as those of manual training in general. Cord work has been chosen as a beginning of the course in the first grade. It is an excellent preparation for sewing. The work is interesting and rapidly completed. Whistle-chains, horse-lines, etc., may be made with chain-stitch and various kinds of braiding. Self-expression is encouraged in the manner of making the cord, in the selection of colors for it, and in the purpose for which the article is made. Knotting and hammock-netting require greater skill, and are utilized in later grades for making a number of interesting articles. Cord work may be well used in all the primary grades in connection with raffia, basketry, and sewing.

Early nations used the needle in many ways adapted to the use of children — in coarse weaving, in basketry, in which rigid material was sewed together with softer fibres, such as wool and twisted bark; in mats, hats, and baskets of the raffia-palm fibre. The hand alone may be used in raffia, or the work may require the use of one tool, the needle.

The simple raffia work of the first grade gradually passes in later grades into basketry. A combination of raffia and splint, or raffia and rattan, is used at first, gradually leading, in the fourth grade, to the use of full rattan. This gives to the classes a gradual increase in the resistance of the material. The weaving of a certain amount of basketry into a course in sewing gives excellent results. The articles are useful and cover a large field of choice, the interest aroused in them is great, and originality is easily attained, as slight differences of pressure and manipulation will cause great varieties in result. Experience seems to show that the variety (both in the use of the muscles needed and in the completed task) which a little basketry will give when connected with the sewing, instead of taking from the skill in the latter, adds to it.

The study of textiles may be a vital part of domestic art and

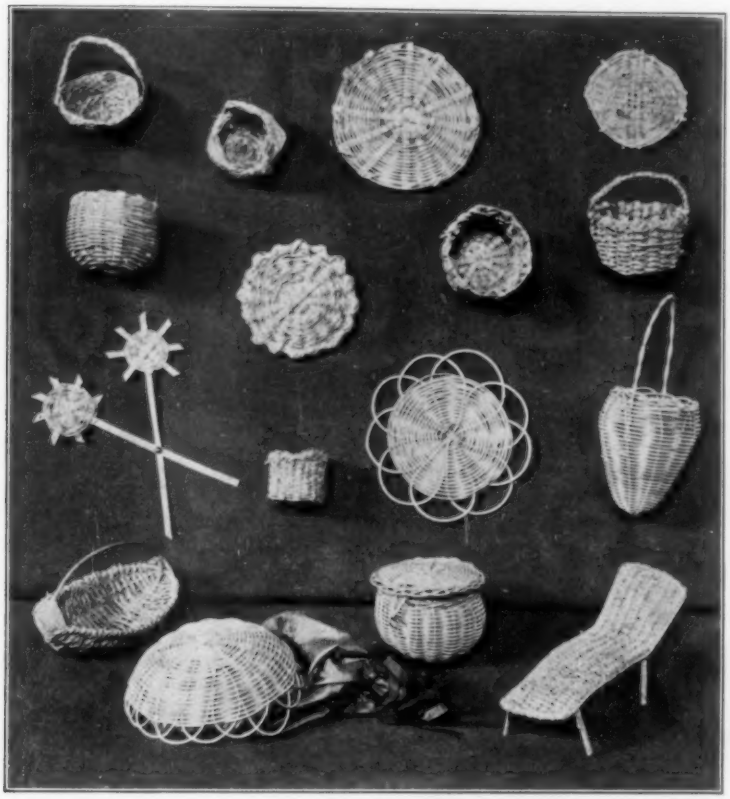


Cord Work.—First Four Grades.

develop an interest in industrial pursuits which fills the child with the desire to understand important facts in life, and which leads to inventive activity. Nor is this interest of a passing nature, but, once begun, continues through life and leads to an appreciation of social conditions. Textile study begins in a simple way in the kindergarten occupations and constructive work. In the first year of the primary school this line of thought should be continued. It may be taken up in some interesting morning talk of the different kinds of clothing worn by the children in other lands — the furs worn by the Esquimaux; the skins worn by the Indians; the textiles worn by other nations.

Questions of the relation of the environment to the development

of certain textiles and of the methods of production easily follow from such a beginning. The investigation may extend into the manner of producing silk, linen, cotton, or wool; or into the industries of spinning and weaving. This is but the beginning of the thread which should lead to an interest in industrial his-

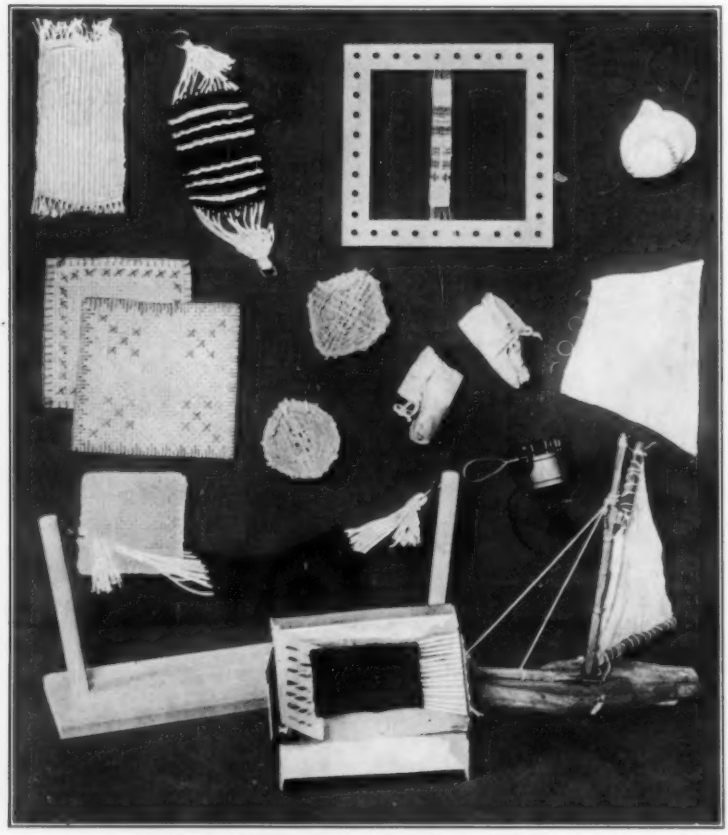


Raffia and Basket Work.—First Four Grades.

tory. Children of six years of age can not only understand primitive methods of preparing fibre for weaving, but can be led to select instruments, to adapt means to ends, and to invent processes and tools. From such training they may receive the power of quick thought and a habit of carrying thought into execution.

The illustration shown in the first grade outline (p. 16), gives

very imperfectly some of the steps in the manufacture of wool taken by a class of children in their first school year. A talk on clothing in the winter season led to the selection of wool for study. The sequence of thought and manual work, briefly outlined, was as follows: The sheep; the condition of the fleece; the soiled, oily wool; washing and scouring; carding; spinning; the comparison of dyed and undyed wool; woven cloth; comparison



Sewing and Weaving.—First Three Grades.

of slat weaving with woven cloth; inventing a loom for cloth; improvements in the loom; developing the beams, harness, selvage, and continuous cloth; weaving a piece of plain cloth;

designing and weaving a piece of patterned cloth; comparing the effect of the woven designs in the blankets made by the children with the stamped designs in calico; the drawing of calico designs; the making of dies, and the printing of muslin from the dies in one color and then in three colors.

A record of the work was kept by each child in samples of the steps in the wool industry, in the making of various primitive looms, in the designing and drawing of illustrations for the verses of "Baa, baa, black sheep," and in the designs and finished results of the calico-printing.

The outline given above shows but one line of textile thought which was followed in the grades of the Horace Mann School. The textile field is rich in suggestion for work in productive thought leading to immediate motor expression. It may be still further developed in later grades, and also in the High School in connection with history, and help the classes to a better understanding of the modern factory system, to the conditions of textile manufacture in America, and to many of the important economic and sociological questions of the day.

The study of textiles is by no means new work in the Horace Mann School, having been in operation for seven years. New views of correlation in grade work and the vital connection of all branches of knowledge are making it each year more important in education.

The domestic art courses are planned with relation to other work of the school year. In the primary grades the history or English are often centers for such correlation. The story of Hiawatha, Norse mythology, Robinson Crusoe, or some tale or poem, may be made the motive for interesting manual work. An Indian village is an excellent center for correlation with all lines of manual training, including modeling, drawing, and color, and increases the feeling of unity in school work. Domestic art in its cord work, basketry, textile work, sewing, and beadwork has many suggestions to offer in this field. Our pupils have made for their Indian villages fish-lines, rope, bows and arrows, hammocks and fish-nets, mats, baskets, and beadwork belts, moccasins, birch-bark canoes, tepees, blankets, looms, and articles used in primitive industries in carding, spinning, and weaving. The illustration (see p. 19) shows a typical village. A similar one was planned, arranged, and set up in a sand tray by a class of children

in their first and second school years. The little Indian loom in the illustration was made for this village by a child eight years of age. The design was original and was in black and red, which the photograph does not show. A large Navajo loom in the class-room and photographs of the Navajos at work were studied by the children for the manner of setting up a loom.

In later grades of the school the basketry, textile work, and sewing continue. Under sewing are included various kinds of clothing in small sizes, useful articles for various purposes, darn-

High School Dressmaking.—Second and Third Years.

ing, patching, simple ornamentation, a little drafting, and some machine-work. All plans are arranged and executed by the children. Dictated work, though having its place, cannot at this time compare in value with work which demands great self-activity on the part of the children in carrying out their own ideas. One grade may also serve another by considering its needs, and in trying to satisfy them. In the past year a sixth-grade class studied the needs of the second grade in the matter of Colonial history. The result was the consideration of Colonial dress and the making of all the clothing for several good-sized dolls after a model designed from a picture of " Priscilla."

In the High School the fundamental principles of dressmaking are taken up. The special aim is to give problems in the construction of garments, gradually increasing in difficulty until the pupils become self-reliant and able to work easily. A knowledge of materials and of their appropriate use, including the cost and selection, with the economical planning and cutting, are a means of connecting domestic art with the social world outside. The illustration gives examples of some of the work of the High School.

Domestic Science in the Horace Mann School

By HELEN KINNE,
Professor of Domestic Science in Teachers College, Columbia University

Domestic science as taken up in the eighth grade of the Elementary School furnishes much necessary information conducing to healthful living, in the study of the preparation of food, cleansing processes, and the manipulation of mechanical contrivances necessary for the carrying out of these processes.

The topics selected are those that appeal to the interests of the children at this age, and the study of the subject in concrete form prepares the way for a more theoretic study of home subjects in the High School as indicated in the outlines given of the course of study.

Domestic science offers opportunity for the expression of thought through the medium of the hand. The pupil sees that thought must underlie right action. The manipulation necessary to the work requires a certain deftness involving muscle control and an understanding of the kind of motion and amount of force needed to produce a given result; as, for example, in the stirring, beating, kneading, and cutting of food materials, the handling of broom and brush, and the rubbing of surfaces in cleansing. In addition to such self-control, the pupil is learning to control conditions outside herself, such as heat and fermentative processes, and is discovering that in order to attain a desired end she must be a worker with nature. In fact, she is aroused to a sense of responsibility in obeying and directing natural forces, and learns that " bad luck " is disobedience and ignorance.

The method pursued is sometimes that of discovery, where the pupil experiments with the effect of heat, proportions, manipulation, and works out a recipe as a problem; or again, the pupil models her work upon something already constructed or designs her own model. The constant appeal which she must make to her knowledge of number, science, or geography helps her to see how all these subjects find their use in daily life.

The laboratory is equipped for individual work, in order that the

children may work independently, except in a few instances where the cost of material makes it necessary for them to work in groups.

Domestic science in the High School gives knowledge of household processes and economy as affected by modern science and industrial conditions. In common with other hand work, it gives insight into industries in their relation to national life through production and commerce; but, more than this, it aims to show how a knowledge of production and manufacture, together with the latest result of scientific research, may make for greater economy in the home. In fact, it is a study of the application of science and scientific method in the home, and a study of the economics of consumption.

While continuing to give training through the hand, domestic science in its wider aspect offers a field for training the pupil in the application of principle in common practice, and leads her to an appreciation of the truth that the truly scientific is the truly practical; it teaches her to balance values through a study of the cost of living and proper utilization of labor; it teaches her to see that simplicity and fitness make for beauty in the home; and it gives her respect for the hand worker, understanding of the conditions of such work, and ability to estimate the amount and quality of work that may be required in a given time.

In general, the method pursued is to gain the interest of the pupil through the actual doing of certain household processes, and then to study these in their wider relations, by experiment, reading, excursion, and discussion. The arrangement of topics as found in the outline is governed by the natural interest of the girl, and by the arrangement of the school curriculum. The subjects involving the greatest amount of hand work are thus placed in the first year of the High School, because the girl at this period is more interested still in actual doing than in the reasons therefor, and also because the course may thereby run parallel to the physical science given in that grade. In the third year those topics are chosen which involve more discussion and for which the pupil is then better prepared. Sufficient hand work is given to illustrate and fix the theories discussed.

Most of the hand work is conducted in the domestic science laboratory, but the equipment for the laundry course is portable and such as might be used in any schoolroom where running water and heat can be furnished.

Some Considerations as to Manual Training Method

By CHARLES R. RICHARDS

Professor of Manual Training in Teachers College, Columbia University

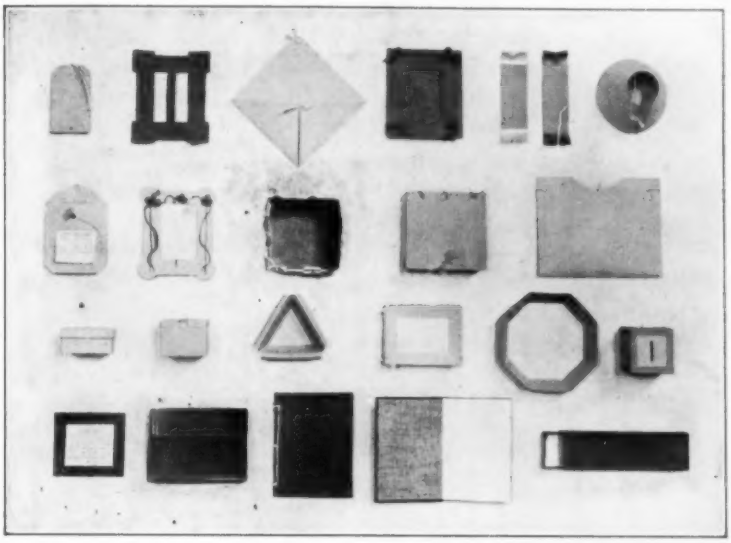
One of the persistent illusions that has appeared in the organization of much of our manual-training work in the lower grades is the idea that some particular series of operations when arranged in a carefully graded "course" provides sufficient opportunities in itself, and is by its nature better fitted than any other vehicle, to meet the needs of each special grade. This idea logically carried out results in courses in one material nicely arranged for one grade followed by similar schemes for the next, and so on, each supposed to represent a complete adjustment to the needs of the respective grades.

There would appear to be several fundamental points of weakness in any such arrangement. First, there is the fact that any sort of freedom in constructive representation requires liberal use of different materials. Second, there is the fact that any one material represents particular qualities and requires special treatment, and while its use tends to develop capacities in one direction it neglects other elements equally valuable; for instance, paper and cardboard construction emphasize the necessity for exactness and orderly procedure; they represent the mathematical precision of the straight line, whereas clay modeling, basketry, and bent-iron work bring in a more free and flexible element. Even if nothing but the quality of the hand training is considered, surely both of these elements should be represented at each stage in any generous scheme of hand work.

Another fact of importance in this connection is the limitation imposed by such restricted courses in the study of the industrial world and in the opportunities for contact with its typical processes. Variety in operations and materials would seem to be demanded in these lower grades, not only by the nature of the pupil, but also as essential to an adequate study of the environment.

That all hand work should proceed from the use of "the fundamental to the accessory muscles" is a principle that has

received considerable emphasis of late years. Some of the exponents of this principle, speaking from the vantage ground of the psychological laboratory, would apparently have no work involving the use of the finger muscles introduced before the age of ten or twelve years. But it is precisely the work with the



Cardboard Work of the Third, Fourth, and Fifth Grades.

fingers that has the most educative return. It is such movements, representing as they do finer co-ordination of nerves and muscles, that require the fullest exercise of brain effort for their control.

We should also bear in mind that the question as to whether any movement is injurious to the bodily welfare of a child can be properly answered only by a study of its actual effects and not by deductions from the very specialized data of accuracy and rapidity tests.

It seems true that in general the control of the large muscles develops earlier than that of the small ones, and that very fine or complex movements should not be required of the pupil until comparatively late in his school career, but it seems also safe to expect that any time after the school age is reached we may safely call upon the fingers to play a large part in all art

and constructive work. The true physiological deduction from the data at hand would seem to be, as far as manual training is concerned, that we should require a liberal use of both large and small muscles in all early stages of hand work.

As has been before noted, one of the practical questions always facing the manual-training worker is the problem of just how to bring the thought of the pupil into the planning and doing of the thing attempted and at the same time secure results that will represent a good influence upon the worker.

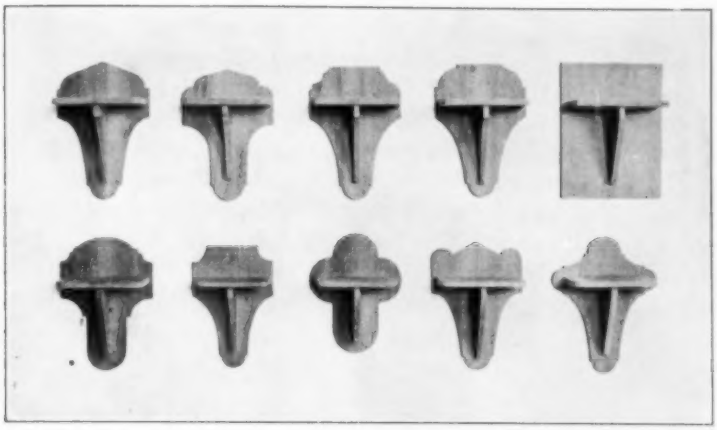
It is evident that we must proceed in this matter with some caution. If "creation is the last faculty of the human mind," it is evidently absurd to expect original productions in such a field as constructive design before a sound experience foundation has been laid. What we may reasonably expect, however, is to gradually foster and strengthen the power of origination through the provision of systematic opportunities for its exercise.

The first essential in securing the expression of individual thought is to develop strong motive. For this we must evidently depend either upon the sympathetic adjustment of the proposed task to the life interests of the worker or upon giving him some voice in the determination of what is to be done. With a proper foundation of motive secured, there is one opportunity always present by which the pupil's own thought may be brought into the work, viz., in developing from him the general form and structure of the project and the method of execution. There are few cases indeed where the too frequent process of exact direction could not be replaced by question and suggestion with immensely healthier results.

Beyond this point lie almost infinite practical possibilities in developing and applying the worker's thought in the design of the thing attempted. Where the work deals with individual projects, the pupil may be given opportunity first, perhaps, of modifying a detail of outline or structure in a proposed design, then a modification of the form, the proportions or the dimensions within given limitations of a predetermined model. Here the idea of the blank model may be used to advantage where the limitations of dimension and the general construction are defined and the details left to the pupil.

Then there is the element, often present, of the decoration with its practical and at the same time most fruitful possibili-

ties for the play of individual ideas. In this last direction manual-training work has undoubtedly been too restricted. We have confined our efforts usually to certain very narrow meth-



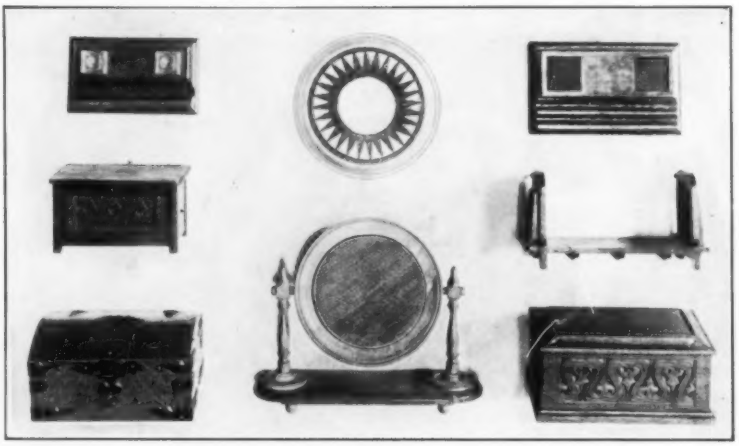
Blank Model with Individual Designs.

ods, and have, as a rule, neglected free treatment, and also that of color. This latter element has been conspicuously absent in all our work, yet its introduction is one of the most natural possibilities of school wood-work, and one that would add enormously to the effectiveness and the appropriateness of much of the work commonly dealt with. A thin wash of neutral color obtained from the ordinary school color-box may transform a bare white picture frame, quite inappropriate for the satisfactory setting of a picture, into a thing of true fitness and beauty. Add to this the opportunities in treating a flat surface with natural or conventional ornament applied with brush and water-color, by grooved lines filled with color or by grooved lines cut through a surface previously washed with water-color or dye, and we have a rich field for color treatment of even the simple products of the fifth grade.

Design Cut through Surface Color.

The free element, outside of the question of color, is also one that needs to be cultivated. The natural structural use of wood tends to emphasize the straight line, and the common products of the school workshop lack the charm of the curve and free movement. To introduce this element, and not to descend into tawdry and inappropriate ornament, requires careful handling. Grooving, free carving, and burning of outline designs offer natural opportunities in this direction.

Free carving still remains undomesticated in manual-training work. It is still too much a matter of the cutting of so many panels undestined for any use, or of the ornamentation of ambitious projects built by the carpenter and often weak in fundamental qualities of structural design. To bring this element into school wood-work in an appropriate way, and, at the same time,



Wood-work.— Second Year High School.

in a fashion practicable of realization by the manual-training instructor, without an art training, means first of all that it must be introduced simply and modestly.

Considerations both as to safety and effectiveness would seem to point to the use of free carving mainly in connection with structural details, and not in the elaborate decoration of flat surfaces; to its use, in other words, as a means of bringing out in a pleasing way the functional facts of a design, and not as an excuse for mere ornament.

Such work is, of course, hardly practicable below the High School, but at this stage it offers a most promising field for conservative experiment. In this province of the High School our work has too long remained in the mere manipulation stage, barren of all pretense and all effort at æsthetic value, and often of purposeful result.

Yet surely if high-school practice is to represent an organic development from the work of the lower grades, one of its justifications must be the introduction of more individual thought and feeling in its productions, and these of a higher and finer quality than that realizable in the elementary grades.

Teachers College Record

ANNOUNCEMENTS OF VOLUME II., 1901

The RECORD will be devoted during the year 1901, as heretofore, to studies in the theory and practice of teaching. The following numbers are in preparation :

Biology in the Horace Mann High School.—Prof. F. E. LLOYD and Mr. M. A. BIGELOW.

Geography in the Horace Mann School.—Prof. R. E. DODGE.

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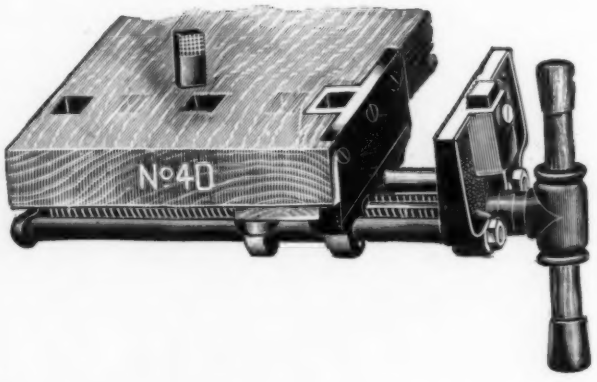

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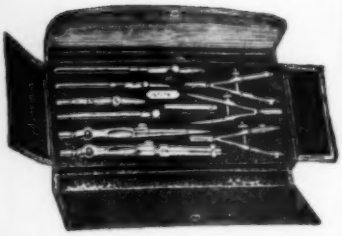

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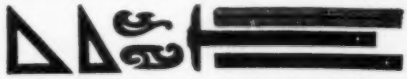

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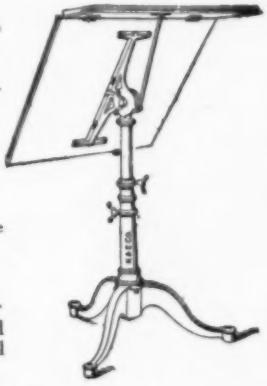

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CONTENTS OF VOLUME I—1900

No. 1 January

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Columbia University, New York City

Columbia University in the City of New York

Columbia University includes both a college and a university in the strict sense of the words. The college is Columbia College, founded in 1754 as King's College. The University consists of the Faculties of Law, Medicine, Philosophy, Political Science, Pure Science, and Applied Science.

The point of contact between the college and the university is the senior year of the college, during which year students in the college pursue their studies, with the consent of the college faculty, under one or more of the faculties of the university.

Barnard College, a college for women, is financially a separate corporation; but, educationally, is a part of the system of Columbia University.

Teachers College, a professional school for teachers, is also, financially, a separate corporation; and also, educationally, a part of the system of Columbia University.

Each college and school is under the charge of its own faculty, except that the Schools of Mines, Chemistry, Engineering, and Architecture are all under the charge of the Faculty of Applied Science.

For the care and advancement of the general interests of the university educational system, as a whole, a Council has been established, which is representative of all the corporations concerned.

I. THE COLLEGES.

Columbia College offers for men a course of four years, leading to the degree of Bachelor of Arts. Candidates for admission to the college must be at least fifteen years of age, and pass an examination on prescribed subjects, the particulars concerning which may be found in the annual Circular of Information.

Barnard College, founded in 1889, offers for women a course of four years, leading to the degree of Bachelor of Arts. Candidates for admission to the college must be at least fifteen years of age, and pass an examination on prescribed subjects, the particulars concerning which may be found in the annual Circular of Information.

II. THE UNIVERSITY.

In a technical sense, the Faculties of Law, Medicine, Philosophy, Political Science, Pure Science, and Applied Science, taken together constitute the university. These faculties offer advanced courses of study and investigation, respectively, in (*a*) private or municipal law, (*b*) medicine, (*c*) philosophy, philology, and letters, (*d*) history, economics, and public law, (*e*) mathematics and natural science, and (*f*) applied science. Courses of study under all of these faculties are open to members of the senior class in Columbia College. Certain courses under the non-professional faculties are open to women who have taken the first degree. These courses lead, through the Bachelor's degree, to the university degrees of Master of Arts and Doctor of Philosophy. The degree of Master of Laws is also conferred for advanced work in law done under the Faculties of Law and Political Science together.

III. THE PROFESSIONAL SCHOOLS.

The Faculties of Law, Medicine, and Applied Science conduct respectively the professional schools of Law, Medicine, and Mines, Chemistry, Engineering, and Architecture, to which students are admitted as candidates for professional degrees on terms prescribed by the faculties concerned. The faculty of Teachers College conducts professional courses for teachers, that lead to a diploma of the university.

1. THE SCHOOL OF LAW, established in 1858, offers a course of three years, in the principles and practice of private and public law, leading to the degree of Bachelor of Laws.

2. THE COLLEGE OF PHYSICIANS AND SURGEONS, founded in 1807, offers a course of four years, in the principles and practice of medicine and surgery, leading to the degree of Doctor of Medicine.

3. THE SCHOOL OF MINES, established in 1864, offers courses of study, each of four years, leading to a professional degree in mining engineering and in metallurgy.

4. THE SCHOOLS OF CHEMISTRY, ENGINEERING, AND ARCHITECTURE, set off from the School of Mines in 1896, offer respectively, courses of study, each of four years, leading to an appropriate professional degree, in analytical and applied chemistry; in civil, sanitary, electrical, and mechanical engineering; and in architecture.

5. TEACHERS COLLEGE, founded in 1888 and chartered in 1889, was included in the university in 1898. It offers the following courses of study: (*a*) graduate courses leading to the higher diploma or to the secondary diploma; (*b*) professional courses, each of two years, leading to diplomas for teachers and supervisors in kindergartens or elementary schools, or for specialists in Domestic Art, Domestic Science, Fine Arts, and Manual Training; (*c*) a collegiate course of two years, which, if followed by a two years' professional course, leads to the degree of Bachelor of Science. Certain of its courses may be taken, without extra charge, by students of the university in partial fulfilment of the requirements for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy.

SETH LOW, LL.D., President.